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Proceedings of the
American Association of Textile Chemists and Colorists

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FEBRUARY 18, 1952

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Calendar of Future Meetings

COUNCIL: April 18, June 13, Sept 19 (all in New York); Nov 6 (Boston).

GENERAL RESEARCH COMMITTEE: Dates and sites are the same as the Council's.

NATIONAL CONVENTIONS: 1952—November 6-8, Boston, Mass; 1953—Sept 17-19, Hotel Conrad Hilton, Chicago, Ill; 1954—Atlanta, Ga.

HUDSON-MOHAWK SECTION: Mar 21, May 2 (Jack's Restaurant, Albany, N Y); June 20 (Annual Outing).

MID-WEST SECTION: April 19 (Cincinnati, O); June 14 (Lake Lawn Lodge, Delavan, Wisc); October 4 (Hotel Bismarck, Chicago, Ill).

NEW YORK SECTION: Feb 29 (Hotel McAlpin, New York); April 18 (Swiss Chalet); May 16 (Swiss Chalet); June 20 (Outing).

NORTHERN NEW ENGLAND SECTION: Mar 7 (MIT); April 18 (LTI); May 16 (Andover Country Club); June 6 (Annual Outing, Merrimack Valley Country Club); Dec 6 (1952 Annual Meeting, LTI).

PACIFIC SOUTHWEST SECTION: March 28, 1952.

PHILADELPHIA SECTION: March 7 (Penn-Sheraton Hotel, Philadelphia); April 25 (Abraham Lincoln Hotel, Reading, Pa); June 13 (Outing, Lu Lu Temple Country Club, North Hills, Pa).

PIEDMONT SECTION: April 25-26 (Clemson Hotel, Clemson, S C); June 6-7 (Ocean Forest Hotel, Myrtle Beach, S C); Sept. 12-13 (Hotel Charlotte, Charlotte, N C).

RHODE ISLAND SECTION: Feb 29 (Johnson's Grill, Providence, R I); Mar 28 (Providence Engineering Society); April 25 (Wannamoisett Country Club); May 23 (Providence Engineering Society); June 6 (Annual Outing—Wannamoisett Country Club); Oct 24 (Providence Engineering Society); Dec 5 (Annual Meeting, Sheraton-Biltmore, Providence).

SOUTH CENTRAL SECTION: May 17 (Patten Hotel, Chattanooga, Tenn); Aug 22-23 (Summer Outing, Chattanooga Golf and Country Club); Dec 6 (Patten Hotel).

SOUTHEASTERN SECTION: Feb 23 (Alabama Power Company Auditorium, Talladega, Ala).

WESTERN NEW ENGLAND SECTION: March 14 (Danbury, Conn); May 2 (Ladies Night, Cheshire, Conn); June 20 (Outing); Oct 3, Nov 14 and Dec 12 (Rapp's).

'52 Convention Theme and Exposition Name Adopted

"AMERICAN Advances Through Creative Chemistry" has been adopted as the theme of the 1952 Convention and Exposition, the 31st Annual Meeting of the Association, to be held November 6-7-8 at the Hotel Statler, Boston, Mass.

George O Linberg, Convention Chairman, has made it known that the Exposition will be known as the "Textile Dyeing and Finishing Exposition", and will be headed by Delbert Ray (Roxbury Carpet Company), Exhibits Chairman. Mr Ray will be assisted by Roland E Derby (Textile Aniline & Color Co), Paul F Martin (Socony-Vacuum Oil Co), and Sawyer F Sylvester (Monsanto Chemical Co).

The Exposition, with a total of 83 booth spaces, will occupy the Ballroom Assembly, Georgian Room and Parlors A, B and C, all on the Mezzanine level of the Statler. Campbell-Fairbanks, Inc, managers of the 1951 Exposition in New York, have been retained for the Boston show.

—♦ ♦—

Dr Finch Discusses Japanese Trip at NNE Meeting

DR ROGERS B FINCH, a member of the faculty of the textile division at MIT, highlighted the January 25th meeting of the Northern New England Section with a talk on his recent trip to Japan as a member of the Engineering Education Mission. The meeting was held at the Hotel Commander, Cambridge, Mass.

According to Dr Finch, the Japanese are rapidly regaining their former position as a leading manufacturer of cottons and rayons. They are said to have also made great progress in the design and manufacture of textile equipment and are now successfully competing with the British in the sale of such equipment. An intensive study of drying methods and equipment is being conducted at the present time. A new synthetic fiber, a biproduct of the fish industry, is now reportedly in the pilot plant stage and shows excellent possibilities when blended with wool. Dr Finch noted that little or no progress had been made in the development of chemical auxiliaries and dyestuffs for the textile industries in Japan. He stated, however, that Japanese industry has shown a new attitude toward basic research and a coordinated program with research units at the universities has been established. In addition, he pointed out that management has realized that the Japanese industry will be in a stronger competitive position in world markets when it can offer products incorporating the latest engineering advances as well as the lower unit cost.

To supplement the talk Dr Finch presented color slides of the Japanese life and culture.

At the business meeting, the proposal of the President's Advisory Committee, that the National Association employ an executive secretary to coordinate the various activities of the association, was read. (To cover the cost of this proposal, the annual dues of associate and senior membership would be increased $2.50 per annum). A discussion of the proposal will be held at the sectional officers' meeting in March.

EMPLOYMENT REGISTER

This column is open for two insertions per year, per member, without charge. Blanks can be obtained from, and filed with, the Secretary of the Association. Lowell Textile Institute, Lowell, Mass. It is understood that these will be open to inspection by prospective employers who can obtain further information from the Secretary.

52-1

Education: BS, Bradford Durfee Technical Institute.

Experience: laboratory and drug room.

Age: 25; married; references; position in piece dye house, New York or New Jersey, preferred.

52-2

Education: BS in chemistry, with graduate study.

Experience: textile research and plant development, project leader.

Age: 33; married; references; position in technical sales, vicinity of New York, preferred.

52-3

Education: AB in physics, with graduate work in chemistry, physics and metallurgy.

Experience: 20 years developing markets for chemical specialties, especially surface-active agents.

Age: 43; married; references.

52-4

Education: BTC, Lowell Textile Institute.

Experience: laboratory colorist and textile chemist, wool, nylon and mixed fibers.

Age: 37, married; references; any location in U S acceptable.

52-5

Education: B S, Chemistry, Mass Inst of Tech.

Experience: research engineer in charge of Technical Service Dept for large worsted manufacturing plant, now shutting down.

Age: 54; married; references from present employers and others; north Atlantic coast preferred. 2-18, 3-3

52-6

Education: B S, Chemistry, Mass Inst of Tech.

Experience: chemist of large worsted manufacturing company now in process of liquidation; formerly Major in charge of chemical company, U S Army; salesman for textile oils.

Age: 48; single with one dependent; references; location immaterial. 2-18, 3-3

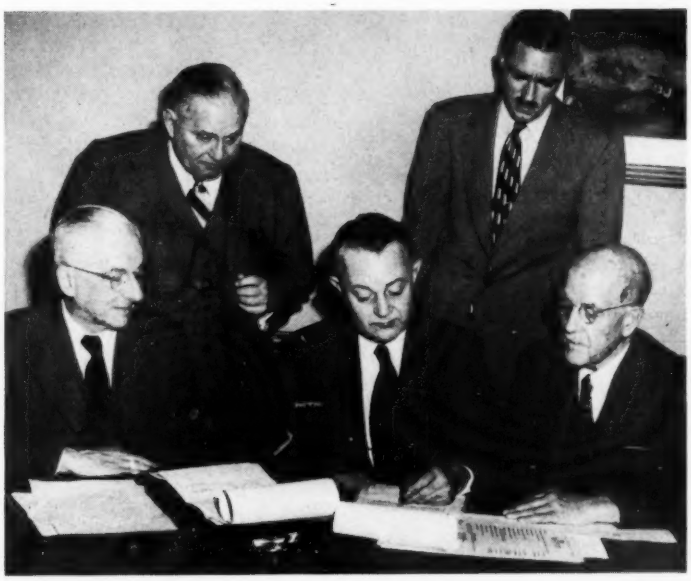
52-7

Education: high school and evening textile school.

Experience: general overseer of finishing, worsteds, woolens, synthetics and blends.

Age: 52; married; references; northeastern U S preferred. 2-18, 3-3

AATCC OFFICIALS SIGN COLOUR INDEX CONTRACT



(Right): President C Norris Rabold is shown adding his signature to a contract with the Society of Dyers and Colourists for joint publication of the Colour Index. Witnesses to the signing, which took place at the January 18th Council Meeting in New York, include (left to right) Harold C Chapin, AATCC secretary, who also signed the contract; William Herrmann, attorney; Edwin R Laughlin, secretary, Colour Index General Committee; and William H Cady, chairman and general co-ordinator of the Colour Index General Committee.

(Left): Other members of the Colour Index Committee in attendance at the ceremonies: (l to r)—Raymond W Jacoby, William A Holst, Jr and William D Appel.

Meeting Report— Rhode Island Section

January 25, 1952
Providence Engineering Society, Providence, R I

AT A MEETING of the Rhode Island Section at the Providence Engineering Society on Friday Evening, January 25, 1952, the speakers were Dr George M Gantz, product engineer, Product Development Department, General Aniline & Film Corporation, who delivered a paper entitled "Fibers, Fabrics, and Finishes of the Future" and Dr Ralph F Nickerson, group leader, textile research, Monsanto Chemical Company, who spoke on "An Investigation of Urea-Formaldeyde Fixation on Viscose Rayon." Attendance was approximately 200.

Respectfully submitted,
R G THOMAS, *Secretary*

Photo by Kenneth C Everett

George M Gantz (left) and Ralph F Nickerson Converse at R I Section Dinner.

30th Annual Convention
Dyeing Group———

TEXTILE FIBERS FROM SYNTHETIC TEXTILES*

GEORGE M GANTZ†
Lincoln Bleachery & Dye Works Div
Lonsdale Company, Lonsdale, R I

INTRODUCTION

IT IS probably quite safe to state that the most significant feature of the textile industry in the past five years has been the development of new fibers. In this period the manufacturers of viscose and acetate rayon have made great strides in devising new fibers based on cellulose. Great progress has been made also in the manufacture of textile fibers from protein raw materials. Even more interesting, perhaps, has been the development of truly synthetic fibers based on resins.

The present and planned production figures for manufactured fibers, shown in Table I, are based on recent reports in newspapers and trade journals *(1-4)*. It is interesting to note that synthetic fibers will soon reach a total production of more than a quarter of a billion pounds per year. Furthermore, other new and useful fibers will be developed in the near future.

The manufacture of a synthetic fiber requires a huge plant investment. Under present conditions it would appear that between two and three million dollars of capital is required per million pounds of fiber capacity per year. Certainly a new synthetic fiber will not be produced under these conditions unless there are sound reasons for believing it will prove useful and competitive.

A comparison of the chemical and physical properties of the synthetic fibers with the natural fibers should reveal the reasons why the synthetics are being manufactured and where they should prove most useful within the textile industry.

G M Gantz

Four new textile fibers made from synthetic resins, namely Dynel, Orlon, Acrilan, and Dacron, together with nylon — will soon reach a total of more than 250 million pounds in annual production. The chemical and physical properties of these new fibers are compared with the natural and regenerated fibers.

In general, the new synthetic fibers have good strength, elongation, and elastic recovery. The staple forms of these fibers resemble wool in many respects, whereas the continuous filaments resemble silk. Spun fabrics made of synthetic fibers show excellent crease-recovery values, particularly at high humidities; Dacron is outstanding in this respect.

It is apparent from the chemical and physical properties of the synthetic fibers that they cannot be dyed readily by the methods normally used for cotton, wool, and rayon. Special techniques involving high temperatures, swelling agents, and metallic ions have been found which greatly facilitate the dyeing of the new fibers. More research is needed to develop dyeing methods that will give them color fastness equalling their inherent durability.

TABLE I
PRESENT AND PLANNED PRODUCTION OF MANUFACTURED FIBERS IN UNITED STATES

	Millions of lb/year
Nylon (in production)	100.0
Nylon (plant planned)	50.0
Dacron Filament (plant planned)	8.0
Dacron Staple (plant planned)	25.0
Orlon Filament (in production)	8.0
Orlon Staple (plant building)	25.0
Acrilan (plant planned)	30.0
Dynel (in production and planned)	10.0
Saran, Velon (uncertain)	5.0
Vinyon	0.2
Total Synthetic Fibers	261.2
Vicara (in production and planned)	10.0
Soybean Fiber	1.8
Total Protein Fibers	11.8
Viscose Staple and Tow	189.0
Viscose Filament (high tenacity)	310.0
Viscose Filament (regular)	317.0
Acetate Staple and Tow	117.0
Acetate Filament (regular)	326.6
Total Cellulose Fibers	1,259.6

CHEMICAL NATURE OF NATURAL FIBERS

CELLULOSE——Before considering the chemical nature of the synthetic fibers, let us review briefly the chemistry and structure of natural fibers. Cellulose is one of the main constituents of all plant life. In the cotton fiber, cellulose is found in a rather pure condition and in a form well suited for yarn and fabric manufacture. In a somewhat less convenient state, cellulose suitable for textile use is found in flax, ramie, hemp, jute, and many other fibrous materials. Cellulose in wood is the basic raw material for the manufacture of rayon.

The chemistry of cellulose and the structure of cotton and rayon have been studied extensively *(5)*. The cotton fiber is composed of long chain-like molecules, which can be hydrolyzed to glucose, a common sugar. Many of these long molecules are parallel and extend lengthwise along the fiber axis. There are strong secondary-valence forces between these parallel molecules ascribed to hydrogen bonding of the hydroxyl groups. Differences in length of the molecules, their orientation along the fiber axis, and the magnitude of lateral bonding forces give rise to the marked differences in fiber properties exhibited by linen, cotton, and viscose rayon.

ANIMAL——Wool and silk are much more complex chemically than the cellulose fibers *(6-7)*. Wool is made up of long polypeptide chains of condensed amino acids arranged in parallel form along the fiber. The side groups of the polypeptide chains are large and bulky in contrast to the hydroxyl groups of cellulose.

Furthermore, they can form electrovalent cross linkages between the carboxyl and amino groups. Another very important link in wool is the covalent sulfur-to-sulfur bond, such as found in cystine. It has been postu-

* Presented before the Dyeing Group at the 30th Annual Convention in New York, N Y on October 17th, 1951.

† Present address: Product Development Department, General Aniline & Film Corp, Easton, Pa.

TABLE II

STRUCTURAL UNITS OF ADDITION POLYMERS

Monomer	*Polymer*	*Side Groups*	*Trade Name*
$CH_2=CH_2$ Ethylene	—C—C—C—C— (H H H H)	None	Polythene
$CH_2=CH\text{-}Cl$ Vinyl chloride	—C—C—C—C— (H H H H; H Cl H Cl)	Cl	PeCe (German)
$CH_2=CH\text{-}Cl$ Vinyl chloride; $CH_2=CH\text{-}OOC\text{-}CH_3$ Vinyl acetate	—C—C—C—C— (H H H H; H Cl H $OOCCH_3$)	Cl, $OOCCH_3$	Vinyon
$CH_2=CH\text{-}Cl$ Vinyl chloride; $CH_2=C\text{-}Cl_2$ Vinylidene chloride	—C—C—C—C— (H H H Cl; H Cl H Cl)	Cl	Saran, Velon
$CH_2=CH\text{-}Cl$ Vinyl chloride; $CH_2=CH\text{-}CN$ Acrylonitrile	—C—C—C—C— (H H H H; H Cl H CN)	Cl, CN	Vinyon N, Dynel
$CH_2=CH\text{-}OOC\text{-}CH_3$ Vinyl acetate	—C—C—C—C— (H H H H; H OH H OH)	OH	Vinylon (Japanese)
$CH_2=CH\text{-}CN$ Acrylonitrile	—C—C—C—C— (H H H H; H CN H CN)	CN	Orlon, Acrilan

lated that the polypeptide chains in wool lie in a folded or accordion-like configuration since this would account for the extensibility and elasticity of these fibers *(8)*.

Silk is also made up of polypeptide chains, but it contains fewer and simpler amino acids. The groups along the molecules in silk are smaller and more compact than those found in wool. They form only the salt type of cross link since silk contains no sulfur. Although wool and silk are both made up of oriented polypeptide chains, note that the chemical and physical differences of the side groups have a great influence on fiber properties.

X-ray analysis of textile fibers has shown that some of the molecules must be arranged in an orderly and regular manner. Modern theories of fiber structure picture "crystallites" or "micelles" of highly oriented molecules embedded in a matrix of amorphous material. Cotton is more crystalline than regular viscose rayon, while ramie and flax are more crystalline than cotton. This concept of crystallinity in textile fibers has proved most useful in explaining many of their physical and chemical properties.

It might be concluded from this brief review that any textile fiber must have long chain-like molecules, a parallel arrangement of these molecules, and polar side groups, which can interact to bind the molecules together. These requirements also hold for fibers from synthetic resins. Useful fibers can be made only from resins of high molecular weight, with linear molecules that can be oriented and crystallized.

TRUE SYNTHETIC FIBERS

CONDENSATION POLYMERS——The excellent researches of Carothers and his coworkers in the field of high polymers are now considered classic. This fundamental work, which led to the development of nylon and Terylene has been of inestimable value to the field of synthetic fibers. Nylon, one of the oldest synthetic fibers, is made by condensing hexamethylene diamine with adipic acid *(7)*. Other diamines and dibasic acids may be used. The condensation is carried out at a high temperature in the absence of air in such manner that the water split out during polymerization is continuously removed. The molten polymer is extruded from spinnerets and then drawn or stretched. Drawing results in orientation or alignment of the molecules, and the stretched yarns have greater tensile strength, more elasticity, and greater toughness and pliability.

A more recent fiber produced by condensation polymerization is Terylene, or Dacron *(9-10)*. Terylene was originally discovered in England by Whinfield and his associates and will be produced there by Imperial Chemical Industries. The fiber will be manufactured in this country by Du Pont under the tradename of Dacron. A polyester resin is obtained by condensing terephathalic acid or its dimethyl ester with ethylene glycol. The fiber is produced in a manner similar to nylon since the molten resin is extruded through spinnerets. Both staple and filament yarns can be manufactured.

ADDITION POLYMERS —— Most of the newer synthetic fibers are made from resins, which are produced by addition polymerization. Unsaturated molecules are reacted under the influence of heat and catalysts to form high-molecular-weight polymers. For usefulness as textile fibers, these polymers must have a linear, or straight-chain, structure. As plastics or synthetic rubbers, three-dimensional branched chain structures are useful.

The basic unit of addition polymers that are used for textile fibers is the ethylene group. Polymerized, the chains are made up of saturated carbon-to-carbon bonds, usually with a side group on alternate carbon atoms. Polyethylene, which has had remarkable success as a plastic and shows considerable promise as a textile fiber, is the simplest resin from the standpoint of chemical structure *(11)*. The important vinyl group is formed when one of the hydrogens of ethylene is substituted. Compounds such as vinyl chloride, vinyl acetate, vinylidene chloride, and vinyl cyanide or acrylonitrile, are all resin monomers. Usually these compounds can be polymerized by themselves or copolymerized with each other. Thus, it is evident that a wide range of synthetic polymers can be produced. A few of the textile fibers that have been developed from these polymers are shown in Table II.

Vinyon, produced by Carbide & Carbon Co from vinyl chloride and vinyl acetate, is the oldest synthetic fiber to be developed commercially in this country. Vinyon contains about 12% vinyl acetate, which serves as an internal plasticizer. The resin can be dissolved in acetone, and the resulting solution is forced through a spinneret into warm air. Continued research by this company resulted in Vinyon N, a copolymer of vinyl chloride and acrylonitrile.

Vinyon N is more heat-resistant than Vinyon and has found wide use because of its excellent resistance to chemicals. The staple form of Vinyon N has been given the name Dynel, and it seems to have great promise as a textile fiber *(12)*. Dynel, which is 60% vinyl chloride and 40% acrylonitrile, is now being evaluated for many different textile uses. It has appeared in blankets and work clothing, just to mention two.

Saran fibers are based on a copolymer of

vinyl chloride and vinylidene chloride, produced by Dow Chemical Co. Extruded in molten form as as monofilaments, these fibers have found wide use in filter cloths, seat covers, window screens, and many outdoor applications. To date, they have not been produced commercially in fine sizes. Possibly they are not well suited for apparel end uses because of their low heat resistance.

Orlon acrylic fiber, developed by Du Pont, is produced by addition polymerization of acrylonitrile *(13)*. Orlon can not be melt spun like nylon or Dacron, and intensive research was required to find suitable solvents for this resin *(14)*. Several were found, and it is believed that dimethyl formamide was the one selected for commercial production of the fiber. Orlon can be produced both as staple and as continuous filament. One of its outstanding properties is resistance to outdoor exposure.

Acrilan, one of the newest fibers, is also based on acrylonitrile *(15)*. It is produced by the Chemstrand Corp, which is jointly owned by Monsanto Chemical Company and the American Viscose Corporation. Very little has been published about this fiber and how it is manufactured. It has been modified in some way so that it has an affinity for acid dyes, possibly by incorporation of vinyl pyridine in the resin molecule.

PHYSICAL PROPERTIES

Table III is a compilation of some physical properties of certain natural, regenerated, and synthetic textile fibers. It is to be expected that the properties of the synthetic fibers will be changed and improved as additional development and production experience is obtained. Furthermore, the physical properties of the synthetic fibers can be regulated to a considerable extent in the course of manufacture.

The fibers based on resins are similar in many respects. Their tensile strength in staple form compares with silk and cotton, whereas their elongation is more like that of wool. Fiber properties of the synthetics are not appreciably different wet or dry, and they all have low regain values. The densities of the synthetic fibers are less than those of cotton and rayon. Acrilan and Orlon are the lightest, Dynel is heavier, as might be expected because of its chlorine content, and Dacron is the heaviest.

ELASTIC BEHAVIOR——One of the most important properties of any fiber is its elastic behavior since this has a strong influence on fabric properties, such as stiffness, drape, and resiliency. The stress-strain curves for several fibers ase shown in Figure 1. Modulus values are obtained from the initial portions of the curves, and the tenacity and elongation are determined from the break

TABLE III

PHYSICAL PROPERTIES OF FIBERS

	Tenacity g/denier	*Wet Tenacity % of Dry*	*Elongation Dry, %*	*Modulus* g/denier*	*Compliance Ratio*	*Elastic Recovery†*	*Density*	*Regain 70°F, 65% RH*
Cotton	3.0-4.9	110-130	3-7	35-50	0.04	52	1.5	7.0
Ramie	6.5	110-120	3-6	170	0	..	1.51	12.0
Silk	2.8-4.9	75-95	13-20	75-116	0.29	52	1.25	11.0
Wool	1.0-1.7	76-97	20-25	20-35	1.04	67	1.30	16.0
Viscose	1.8-2.4	44-54	16-20	70	0.37	51	1.5	11.0
Acetate	1.2-1.8	56-70	23-30	40	0.91	46	1.3	6.0
Nylon	4.5-5.7	85-90	18-22	20-25	-0.19	89	1.14	4.2
Dacron filament	4.5-6.0	100	15-25	86	-0.05	65	1.38	0.5
Dacron staple	3.0-3.9	90-100	25-40	20	1.05	70	1.38	0.5
Orlon filament	4.0-4.8	90-95	16-21	83	0.11	50	1.18	1.0
Orlon staple	..	90-95	..	34	0.68	51	1.18	1.0
Dynel	2.5-3.0	90-100	35	45	0.50	..	1.28	0.5
Acrilan	3.8	90-100	17	..	..	50	1.14	1.6
Glass	6.4	100	2.0-3.0	344	0	..	2.5	0

* for 100% elongation. † Dimensional recovery after 5% stretch at 60% RH.

point. However, the shape of the entire stress-strain curve is quite important.

Research workers in the rayon department of E I du Pont de Nemours and Co have devised the term "compliance ratio", which seems very useful to denote differences in the stress-strain behavior of textile fibers *(16)*. Compliance is the reciprocal of stiffness. The "compliance ratio" is defined as the compliance at 10% elongation minus the compliance at 5% elongation, divided by five. Values for several fibers are listed in the fifth column of Table III.

Wool fibers elongate very readily after about four per cent stretch, and this leads to a high compliance ratio. Cotton and silk have stress-strain curves more like straight lines, and their compliance ratios are low. Nylon has a negative compliance ratio because it stretches readily at first and then becomes stiffer with increasing elongation. Upon the basis of compliance ratios and stress-strain curves, Dacron staple, Orlon staple, and Dynel have wool-like characteristics. Continuous filaments of Dacron and Orlon have low compliance values and should be more like silk.

The excellent elastic-recovery properties

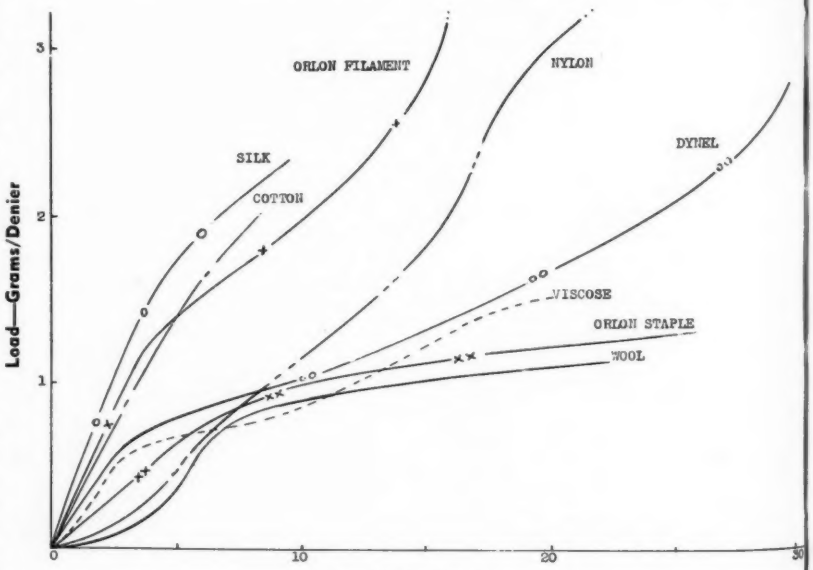


Figure 1
Typical Stress-Strain Curves

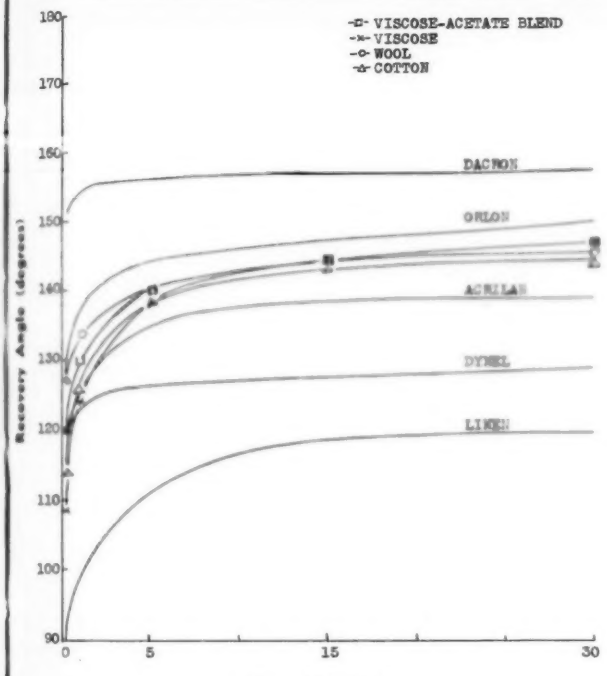


Figure 2
Crease Recovery Angles at 70°F, 65% R H

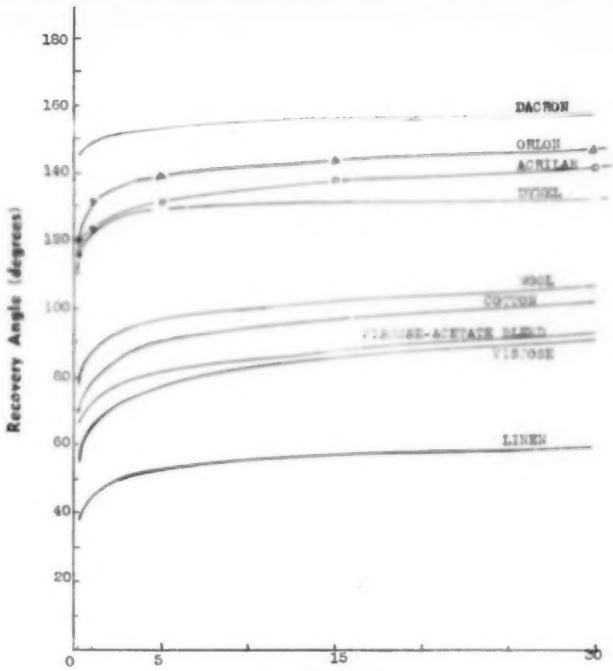


Figure 3
Crease Recovery Angles at 70°F, 95% R H

of wool are probably its greatest asset. From the data in Table III it is evident that the synthetic-resin fibers also have good recovery properties *(17)*. Fabric resiliency, or wrinkle resistance, is a complex subject and is affected by many factors in addition to elastic recovery of fibers *(18)*.

Fabric samples made of spun yarns of several synthetic fibers were obtained and compared with wool, cotton, and rayon for wrinkle resistance. The tests were carried out at 70°F and at two relative humidities, 65% and 95%, with a Monsanto wrinkle-recovery tester. The wool, Dacron, Orlon, Dynel, and Acrilan fabrics were similar in weight and construction and had been boiled off. The linen, cotton, viscose, and viscose-acetate blend were suiting fabrics, which had been given a crease-resistent finish with urea-formaldehyde resins. The results are shown in Table IV.

The data in Table IV are illustrated in Figures 2 and 3 by plotting crease-recovery angles against time. Dacron is outstanding among all the fibers for its instantaneous and high degree of recovery from creasing. All four fabrics made with synthetic fibers show little or no difference in crease recovery at 65% and 95% relative humidity. On the other hand, wool and the resin-treated fabrics have considerably lower crease-recovery values at the higher humidity.

TABLE IV

CREASE RECOVERY ANGLES FOR FABRICS
(Average of warp and fill—Monsanto Wrinkle-Resistance Tester)

Fabric	*% Relative Humidity at 70°F*	*Recovery Angle In Degrees*				
		15 *sec*	1 *min*	5 *min*	15 *min*	30 *min*
Cotton	65	114	126	138	143	144
	95	69	80	89	97	101
Linen	65	90	100	111	118	120
	95	38	45	52	56	59
Viscose	65	108	124	138	144	147
	95	55	64	77	85	91
Viscose-Acetate Blend	65	120	130	140	144	147
	95	66	72	81	87	92
Wool	65	127	134	140	144	145
	95	77	88	97	101	107
Dynel	65	119	123	126	128	128
	95	120	124	129	131	132
Acrilan	65	117	126	135	138	139
	95	110	123	131	137	141
Orlon	65	126	138	144	147	150
	95	116	133	138	144	147
Dacron	65	151	155	156	157	157
	95	146	149	153	155	156

DYEABILITY

Although textile fibers made from synthetic resins have many valuable fiber properties, they represent a challenge to the textile industry. Their low regain results in an accumulation of static electricity, which makes them more difficult to process in the mill, the finishing plant, and in garment manufacture. They are strong, chemically resistant, lightfast, and abrasion resistant, yet little progress has been made in dyeing the new fibers with colors that are equally durable. Fortunately, the dyeing of the new synthetic fibers is an active field, and new developments may be expected as research continues *(19-24)*.

Table V is a tabulation of various classes of dyes with an indication of their applicability to different fibers. The dyeing of cotton, viscose, acetate, and wool has gradually changed from an art to a science. By reviewing modern theories of dyeing these older fibers *(25)*, the reasons why the newer synthetic fibers are difficult to dye may become apparent.

TABLE V
DYEABILITY OF VARIOUS FIBERS

	Vat	*Leuco Ester*	*Naphthol*	*Direct*	*Acetate*	*Acid*	*Chrome*	*Premetal-talized*	*Sulfur*
Cotton	X	X	X	X	—	—	—	—	X
Viscose	X	X	X	X	—	—	—	—	X
Acetate	—	—	—	—	X	—	—	—	—
Nylon	X	X	X	X	X	X	X	X	—
Dacron	X	X	X	—	X	—	—	—	—
Orlon	X	X	—	—	X	X	—	—	—
Dynel	—	X	—	X	X	X	—	—	—
Acrilan	X	X	—	—	X	X	—	X	—
Wool	—	X	—	—	—	X	X	X	—

The amorphous regions in cellulose fibers swell in water and can absorb dye molecules. It is believed that the dye molecules are absorbed on the crystallite surfaces and are held by hydrogen bonding to hydroxyl groups. Amorphous regions in wool also swell in water, and wool contains positively charged basic groups, which serve as the site of attachment of acid and milling colors. The synthetic fibers do not contain highly polar hydroxyl or amine groups nor do they have amorphous regions that swell in water.

The dyeing behavior of nylon and acetate may be considered intermediate between the natural fibers and the newer synthetic fibers. Neither acetate or nylon swell appreciably in water.

Nylon does contain basic units in the form of terminal amine groups, but these are limited in number. This accounts for the "blocking effect" observed with nylon. Dispersed acetate dyes, which are characterized by solubility in organic liquids, can be applied to both nylon and acetate rayon. The dyes are held within the fibers by hydrogen bonding with carbonyl or amide groups.

Although little information is available regarding the degree of crystallization of Dynel, Orlon, Acrilan, and Dacron, it is evident that these fibers do not have amorphous regions that absorb water. Consequently, this route of entry of dye molecules into the fiber is not available. The dispersed acetate dyes are absorbed by the synthetic fibers presumably by the same mechanism that applies to nylon and acetate. Even these dyes require long dyeing times at the boil and leave much to be desired in the way of fastness. The deliberate incorporation of basic groups in the resin molecule of Acrilan fiber to confer dyeability with acid-type colors can be appreciated in light of the discussion above.

Dye absorption by synthetic fibers can be increased by adding certain chemicals to the dyebath. These chemicals are termed "carriers" or swelling agents and they function by swelling the fibers, at least on the surface or in amorphous regions, so that dye molecules can penetrate. Such compounds as cresols, phenols, particularly p-phenylphenol, benzoic acid, methyl salicylate, and monochlorbenzene have been used. Certain carriers are best suited for each fiber. Care must be taken both in applying and removing these chemicals. The field of carrier dyeing is quite active, and new compounds may be found which are more effective, cheaper, or less toxic.

The discovery was made by research workers at Carbide & Carbon Chemical Corp that many metallic ions are absorbed by fibers containing acrylonitrile and that some of these ions can serve as dye assistants *(26)*. Cuprous ion is particularly effective in increasing the absorption of acid, direct, and soluble acetate colors. It is believed that the metallic ions are bound to the resin molecules by chelating with the nitrile groups and then insolubilize the dye molecules. This "copper technique" can also be used with leuco-ester dyes.

The main problem in applying vat dyes or leuco esters is poor crockfastness. Apparently, these dyes fail to penetrate very far into the fiber. Certain vat dyes and leuco esters penetrate more thoroughly when the dyed fibers are heated to a high temperature for a short time. This process, developed by Du Pont, has been called the "thermosol" method *(27)*. It seems to be particularly applicable to Dacron. Acetate colors can be used as well as vats or mixtures of the two. The thermosol process is also applicable to Orlon and nylon, but it is less promising for these fibers. Dynel cannot be dyed by this process because it is too sensitive to heat.

Of the new developments in dyeing, the use of high temperatures seems most promising for the synthetic fibers. Equipment for dyeing at high temperatures is not generally available in the textile industry except stock or package dyeing machines, which can be pressurized. The high-temperature dyeing process has been particularly valuable for Orlon fibers, since many acetate and vat dyes that give only light shades at 212°F can be dyed in medium or heavy shades at 250°F. Dacron also can be dyed more easily with vat and acetate colors at temperatures above 212°F.

The molten-metal, or Standfast, process is an English development, which has created a lot of interest in this country *(28)*. In this process, a low-melting alloy is kept at 205°F in a U-shaped vessel and serves as a heat transfer medium. Apparently, the metal cannot be heated above 212° F or steam bubbles will form on the cloth. This causes turbulence in the metal and results in streaky dyeing. No information has been made available about the application of this process to synthetic fibers.

The hot-oil process is a new dyeing method developed by General Dyestuff Corporation *(29)*. In this operation, a selected mineral oil is used at a temperature of 225°F in a Williams Unit. The oil is used as an inert, oxygen-free, heat-transfer medium. The only information available on this process concerns the application of vat and sulfur colors on cotton. Although this process is limited as to time and temperature, it may find application to synthetic fibers.

CONCLUSION

Textile fibers made from synthetic resins will be of increasing importance in the textile industry. These new fibers have many excellent chemical and physical properties, which should insure their acceptance by the textile industry and the ultimate consumer. The staple forms of the new fibers have certain characteristics like wool, and they will probably replace or extend this fiber in several applications. The dyeing characteristics of the new fibers are poor by comparison with the standard methods used on cotton, wool, and rayon. Special techniques have been developed, which help considerably in dyeing synthetic fibers, but much more research will be required to deveop processes that result in good fastness qualities.

ACKNOWLEDGMENTS

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Thirtieth Annual Convention
Finishing Group——

STATIC PROBLEMS AND THEIR CONTROL IN THE TEXTILE INDUSTRY*

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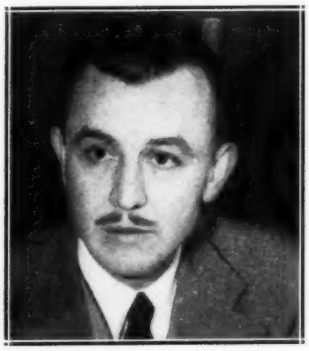

Joseph A Lopez

This paper outlines for the textile industry the nature of the static problem in textile-processing operations, the reasons for the increasing seriousness of this problem, and the four major ways in which static affects textile operations. It describes in some detail the methods currently in use to overcome this problem, and the success of these methods is evaluated.

The paper also describes an electronic static-control instrument, which has been developed on the principles of "controlled diffuse discharge". This instrument in a representative number of plants has opened the way for more effective and completely safe control of the static problem.

John K Hewson

INTRODUCTION

THE problem of static control has been present in the textile industry in greater or lesser degree for a great many years. For a long time it was only a casual problem that the industry learned to live with through the use of relatively simple controls, such as the grounding of machines, the use of metal brushes, and an increase of the moisture content of the air.

Three factors have made these older methods of control largely ineffective:

1) The introduction and widespread use of synthetic fibers, such as acetate yarn, nylon, fiberglas, Vinyon, Orlon, Dacron and many others.

2) The steadily increasing speed at which textile machinery is operated. The pressure for increasing output per man-power hour is tremendous and unceasing. With these increases in speeds the severity of the static problem has increased enormously and in some operations has become a controlling factor.

3) The third factor is the pressure for improvement in the quality of finished goods. Quality defects caused by static have become a factor in downgrading and reducing the sales price. With goods of coarse grade such static-caused defects were of minor importance, but, with improving quality standards in industry, this no longer is the case.

STATIC FORMATION

CAUSES——Static formation is a phenomenon about which there are many dissenting views. Actually, many different things affect the formation of static. Friction and pressure are two of the principal causes, but mere movement of textile fibers at high speed through air frequently is sufficient to generate enough static to cause trouble. With the new synthetic fibers, which frequently are highly dielectric in nature and whose moisture regain is low, it takes very little friction or pressure to result in static conditions.

EFFECTS——In the textile mills there are four major problems caused by static:

1) Reduction in output
2) Impairment in quality
3) Increase in waste
4) Fire or explosion hazards

Farther on in this report where static problems on specific textile machines are discussed, each of these four effects will be outlined in detail.

PRESENT CONTROL METHODS——Many different methods have been attempted in the past to reduce the intensity of static charges in textile-processing operations. Each of these methods is able to control the intensity of static to a greater or lesser degree depending upon the speeds involved, the type of fiber being processed, the nature of the process (i e, the type of machine) and the intensity of the static charge involved. Listed below are some of the better known methods for controlling static in textile mills and other industrial plants:

1) *Grounding the machine.* This requires running a connection from each machine to a good ground. To the extent that this ground drains the static charge off the fiber, this represents a good and inexpensive method of static control. The difficulty, however, is that grounding machines does not drain sufficient static charge off the fiber to give satisfactory results. Furthermore, it is very hard to be sure that the machine is really grounded as oil or air spaces between various parts of the machine can

* Presented in New York on October 19, 1951, by Joseph A Lopez.

break off the connections to ground very easily.

2) *Grounding the textile itself.* The second method of static control has been to suspend a grounded metallic brush of tinsel across the web of material so that it passes over or under the brush. The end of the brush should be connected to a good ground to be operative. This type of simple static control can work very well where only mild charges of static are involved or where speeds are relatively slow.

3) *Humidity control.* A third method for reduction of static is to humidify the room where static is a problem. With cotton, viscose, rayon, and wool, humidification can do a reasonably satisfactory job of static elimination, provided adequate control over the opening of doors and windows can be maintained. It has been found, however, that a variation of only 5% plus or minus in relative humidity in a card room is enough to cause immediate static difficulty. Furthermore, on high-dielectric fibers where moisture regain is low, it is difficult for humidification to bring about much reduction in the intensity of static. Also, in operations, such as on loop dryers or rewinders after the drying oven, merely humidifying the room does not give much relief from static. Keeping the relative humidity high enough to reduce static to a satisfactory level frequently causes other difficulties. For example, without a complete air-cooling installation, raising the relative humidity results in acute personnel discomfort whenever the weather is warm. Secondly, when humidity is kept at a high level, maintenance costs can sharply increase on the machines themselves because of excessive corrosion of metal parts. This is particularly true in carding operations. Finally, raising the level of humidity may result in softening the size on the yarn. This may cause major impairment of yarn quality.

4) *Chemical antistatics.* A fourth method for the reduction of static is the use of antistatic chemical finishes on the yarn. For some types of fibers and certain types of operations antistatic chemical finishes have shown promise as an effective method for controlling static. The use of these finishes in conjunction with proper grounding devices and humidity control has the advantage of lasting through several processing operations without renewal. The disadvantages of this method of static control include the problem of maintaining its efficiency when the fiber is drawn or stretched beyond its length after application of the agent. Also, extra processing operations are required, first, to apply the antistatic agent to the yarn and, secondly, to scour this agent off the yarn. The expense of using these chemicals is also a factor, especially when substantial amounts of yarn have to be treated.

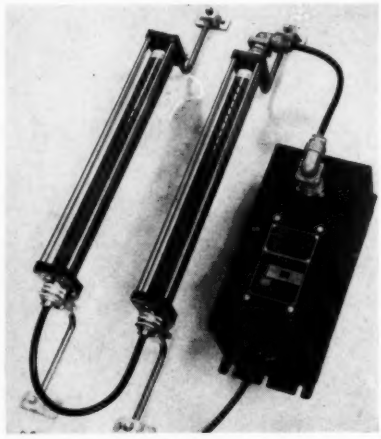

Figure 1
TAKK, a Two-Bar, High-Speed, Static-Control Unit with Controlled Diffuse Discharge.

5) *Radioactive salts.* Another method for the control of static is through the use of radioactive salts placed on a metal bar and suspended above or below the moving fiber. This bar or type of control provides an ionizing path for draining the static charge off the material. When properly grounded and used in accordance with the manufacturer's instructions with respect to the protection of the personnel from overexposure, this unit has helped to reduce the static problem on many textile operations when speeds are not high and where static conditions are not severe.

6) *High-voltage discharge bars.* Another method of controlling static is through the use of high-voltage discharge bars suspended across the folding web of material in the same manner that metallic brushes and radioactive bars are suspended. These bars operate from a high-voltage source and again provide an ionizing path to permit the draining off of the electrical charges on the fiber or material being processed. Of vital importance in the effective performance of this type of static control is exact control of the electrical discharge so that all emitters along the entire length of the bar have the same intensity of discharge. If this is not accomplished, then only uneven control of the static problem is achieved as excessive discharge from the high-voltage emitters may recharge the fabric. At other places the static charge is not removed from the web of material because of inadequate intensity of discharge from the emitters. Other considerations that should be taken into account are that there be adequate protection of personnel from electrical shock and also proper design to permit static controls to be installed and used in areas where volatile solvents or where cotton or rayon dust or lint can easily be ignited. As with almost any high-voltage equipment, maintenance is also an important consideration and should not be excessive.

ELECTRONIC STATIC ELIMINATION BY CONTROLLED DIFFUSE DISCHARGE

A comparatively recent development in the field of static control is the perfection of equipment designed to take advantage of the principles of controlled diffuse discharge. This electronic equipment consists of a central station control, which provides a high voltage source to which are connected, as a completely ballasted system, individual control bars in which each discharge point is exactly calibrated so that the amount of electrical discharge from each point is the same. Furthermore, because of the use of individual resistors, the maximum allowable discharge, even when the discharge points are shorted out accidentally or on purpose, is in the neighborhood of only one microampere.

Figure 1 shows a typical unit of this equipment.

This equipment controls the static by blasting the fiber of cloth with ions having a charge opposite to the charge already on the material. The moment that the material has been neutralized by this means, the discharge from the control bars is instantly diverted to collecting targets built into the static control bars. The equipment is of course grounded, and the excess discharge from the control points is automatically drained off to ground. In other words, the electrical charge on the material is instantly neutralized by positive control, but no electrical charge will remain or be placed upon the material by the static control bars themselves.

This equipment is designed specifically to meet and to solve the static problems on highly dielectric man-made fibers at the higher speeds at which textile machinery is being operated. It is effective in the control of static from charges so light as to be barely detectable through to the upper range where static charges are so severe as to arc 12 inches or more. This effectiveness is maintained up to any speed up to 4000 feet per minute for any kind of moving material and for any intensity of static charge. The equipment is completely safe for operating personnel, and

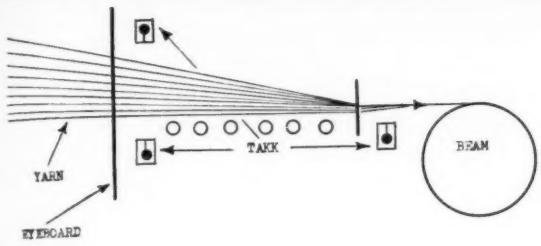

Figure 2
Warpers or Beamers

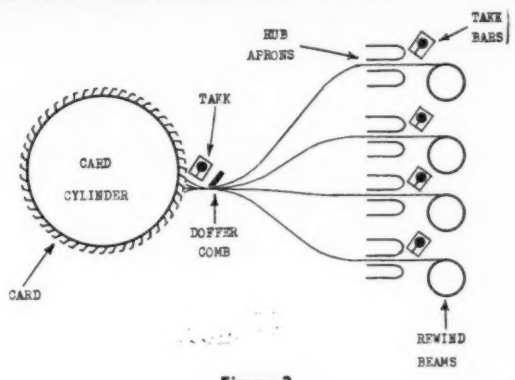

Figure 3
Cards—Wool

there is no shock hazard or health hazard of any sort. Because of the incorporation of the principles of controlled diffuse discharge in this equipment, it is operating safely in areas where static may cause fires or explosions because of the use of volatile solvents or where cotton or rayon dust and lint are present in the atmosphere or on the machines. Highly successful installations of this equipment have been made to date on over twenty different types of textile-processing operations. The performance and safety of these units is so outstanding that over one-third of all the installations made to date have represented replacements of all other types of existing static-control methods.

SOLUTIONS OF TEXTILE PROCESSING OPERATIONS

We now come to a discussion of static problems for specific types of textile processing operations and to methods of solution of those problems. In all cases the suggested solutions are based on successful field installations.

WARPERS——One of the first places where static becomes an acute operating and quality-control problem is on warpers. On these machines the static charge on the yarn causes the yarn to balloon to such an extent that breakage and poor-quality warps are common. Static also causes "ridging" of the yarn on the beam and causes the yarn to "flow" over the ends of the beam. Breakage of the yarn automatically stops the machine, while a poor warp impairs quality in subsequent operations.

To overcome these two problems it has been necessary to operate warpers at speeds much lower than their normal rate of speed and to increase relative humidity well beyond the comfort zone of operating personnel. Cutting down speed means sharply lower production, while increasing humidity can result in impaired quality of the yarn because of softening of the size on the yarn, which at times impairs the quality of the yarn itself.

This problem has been largely overcome on all types of warpers through the installation of electronic static controls at the locations shown in Figure 2. These units not only eliminate ridging and flowing on the beam but permit sharply increased normal operating speeds and a sharp reduction in relative humidity. It has been reported many times that installation of these electronic static controls have proven extremely valuable in increasing production and in improving quality to the extent that the cost of such installations pay for themselves several times in a single season.

CARDS——In the card rooms on both woolen and cotton cards and on all types of natural or man-made fibers, static is frequently an expensive problem. When static charges are present, it frequently causes the web of fiber to "load" on the card cylinder itself until it does not strip away properly at the comb. In addition, excessive waste is caused by the breaking away of the web from itself after it has been stripped off the card cylinder. A third problem, which applies particularly to woolen cards, is on the tape condenser. After the yarn has been fed through the rub aprons, a static charge may cause the sliver to break and to wrap around and around the rub aprons. This again is a serious cause of waste. At today's high prices, this waste problem is particularly significant.

Methods of static control previously used on cards included running the cards at a slower speed, sharply increasing the relative humidity in the card room, or even shooting steam jets onto the fiber during the carding operation. These three methods not only were extremely costly in terms of production and quality but were only partially effective. Also, increasing the relative humidity had to go far beyond the comfort zone of the operating personnel and logically resulted in a demand for a complete and expensive air-cooling installation. Finally, the high humidity resulted in excessive maintenance costs due to the corrosion of the card clothing. Furthermore, the cards had to be operated sometimes as low as one-third of their normal operating speed in order to get the yarn or fiber properly carded. As cards are a major production component, running them at such low speeds seriously curtailed output.

Successful control of the problems outlined above has been achieved by a number of textile mills through the use of electronic static controls installed at the locations shown in Figure 3. On a cotton card only a single bar at the comb is necessary except on double doffers, where two bars are required. As shown by Figure 3, these control bars need not be installed immediately adjacent to the fiber but may be installed at any distance up to 6 inches away from the stripping operation. On woolen cards with tape condensers additional bars are necessary to control the problem on each rub apron.

It may be stated conservatively that maintenance of full operating speeds has been permitted through the use of these electronic static controls regardless of the intensity of the static condition and that the percentage of waste has been substantially reduced by the installation of these units.

TENTERS, LOOP DRYERS, SHEARS, SANFORIZERS——In this group of machines the presence of static on the finished cloth can become so severe as to impair quality by picking up dirt and lint from the air and depositing it on the cloth. At times this condition is so acute as even to attract dirt from the floor. Needless to say, the presence of this foreign matter on the cloth can cause a

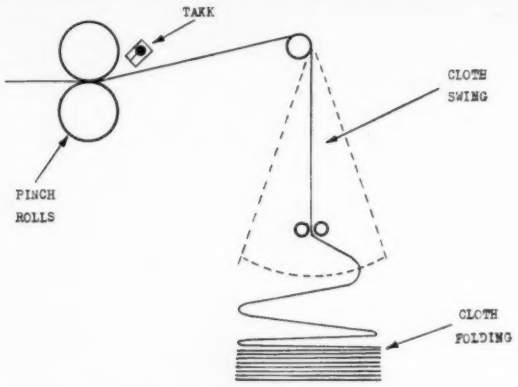

Figure 4
Loop Dryers, Tenters and Shears for Cotton and Viscose

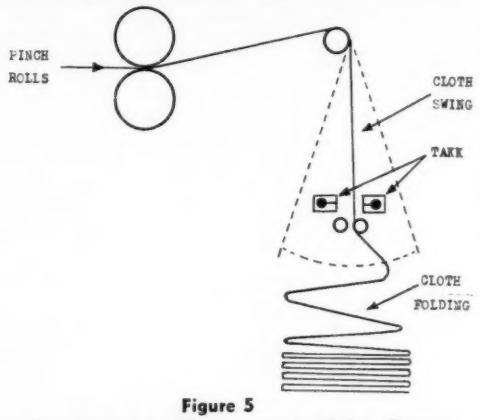

Figure 5
Loop Dryers, Tenters, Shears, etc for Nylon, Dacron, Acetate, Orlon and Fiberglas

buyer to downgrade quality. In addition, static charge frequently causes the cloth to wrap around the delivery rolls and does not allow the cloth to fold properly into a bin but causes it to balloon out over the floor.

The static problem outlined above has been partially controlled in the past by reducing the speed of the finishing operation, by the use of steam jets, by additional personnel to handle the delivery of cloth manually, or by all three expedients.

Installations of static controls in the locations shown in Figures 4 and 5 have been effective in the control of this problem. On cotton and wool fibers a single bar located as shown in Figure 4 has been adequate to meet the problem; on highly dielectric fibers, such as fiberglas, nylon, etc, it has proven advantageous to install the bars facing each other so that the cloth passes between the bars as shown in Figure 5.

TEXTILE AND VINYL PRINTING ——In this operation static not only impairs quality but constitutes a serious fire hazard in the presence of volatile solvents. Quality is impaired by the appearance of "crows feet" or "feathering" of the ink beyond the desired pattern. These defects appear because the static charge on the fiber or film attracts the ink out in the form of these "crows feet". A similar problem arises in flocking operations where again the static attraction on the cloth causes the flock to adhere to the cloth where it is not wanted. Both of these two effects naturally result in downgrading the finished product.

The presence of static in this operation also shows up in the arcing of the static charge to the impression cylinder or to other metal parts of the machine. This would not be serious were it not for the fact that the ink used is carried in a highly volatile solvent, the vapors of which can be ignited instantly by these arcs. Close control over ventilation and solvents plus the installation of an automatic carbon-dioxide system are highly desirable. The static hazard still exists, however, and, even with the installation of these preventive measures, may cause fires that can put a machine out of production.

Use of the electronic static controls previously described have been highly effective in eliminating the quality defects of "crows feet" and "feathering" and have effectively eliminated the fire hazard where volatile solvents are present. There are case histories available where machine speeds of less than 60% efficiency have been restored to full efficiency upon elimination of the static hazard. Case histories are also available indicating that the cost of refilling carbon-dioxide extinguishers in one month was greater than the cost of a complete static-control installation. Needless to say, an effective static-control installation on this type of operation has proven to be extremely valuable and is available to this branch of the textile industry.

LOOMS——On looms static again is becoming one of the serious causes of quality impairment. As looms normally are operated at full operating speeds in spite of static or other operating problems, little or no increase in output can result from elimination of the static problem. On the other hand, static can and does result in the manufacture of a larger percentage of seconds or defective cloth, which is either unsalable or must be sold at reduced prices.

On looms static causes quality impairment by attracting air-borne dust and lint onto the warp. This dust is scraped off when the yarn passes through the drop wires or heddles and builds up at these points. When these drop wires or heddles are disturbed in any manner, the accumulated dust and lint falls down on the warp and is woven into the cloth to appear in the form of a heavy streak, sometimes up to 3 feet long, that cannot be scoured out of the material.

A second impairment is caused by the yarn in the shuttle being attracted to some part of the loom by static. This results in "looping" or a snag and may stop the loom. A third quality impairment is apparently caused by static charges on the woven cloth, which lead the threads to repel one another. This causes "cracks" in the finished cloth.

Attempts have been made to solve these quality-control difficulties by grounding the looms and increasing the humidity in the loom sheds to a very high level. This not only has resulted in acute personnel discomfort, again resulting in increased pressure for complete air-cooling installations, but also has resulted in softening of the size of the yarn to a very serious extent. When the size has been softened in this manner, it further accentuates quality impairment by permitting the size to be scraped off on the drop wires and heddles and sometimes makes the problem of streaking even greater than before.

All these problems arising in the weave sheds because of static difficulties may be overcome by the installation of static-control equipment at the locations shown in Figure 6. With static-control equipment installed, the relative humidity may be lowered to a more comfortable level without causing static conditions to become apparent. This also automatically eliminates the size problem, while dust and lint from the air will not be attracted to the warp. Looping of the fill will disappear, and cracks in the cloth from static repulsion will be corrected. (In this connection a word of caution is in order. Where cracks and other defects in the cloth are the result of the looms being

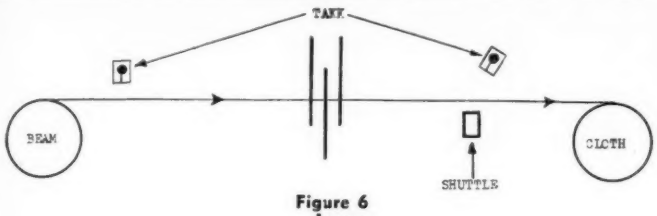

Figure 6
Looms

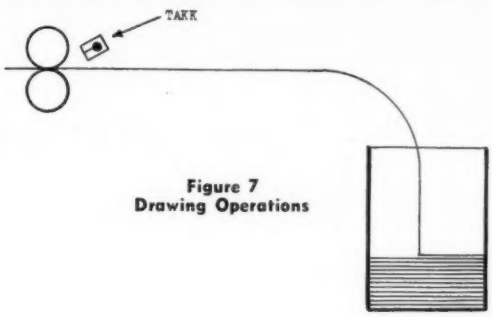

Figure 7
Drawing Operations

out of adjustment mechanically, no form of static control can correct this mechanical difficulty.)

DRAWING OPERATIONS —— Static is also a problem on those machines whose function is to draw or stretch out textile fibers. This includes draw frames, gill boxes, pin drafters, etc. On these machines static interferes with operations in two ways:

(a) It interferes by causing the fiber to lap around the rolls instead of delivering properly into the can and

(b) The yarn refuses to coil properly in the cans but instead sticks to the sides of the can and floats out over the sides. This lapping difficulty is costly because there is a substantial percentage of waste caused by this one problem. Not only is waste involved but operation of the machines at slower speeds to reduce the static difficulty substantially reduces output. Improper coiling in the can results in the fiber attracting dust, dirt, etc from the floor. To overcome these two difficulties, humidity again has been raised to uncomfortable levels, while extra help is needed to be sure that the coiled yarn is kept feeding into the cans properly and to stop the machines occasionally to remove the waste caused by lapping. With electronic static control as shown in Figure 7 the lapping problem, to the extent that it is caused by static, is greatly reduced, while the yarn coils into the can properly.

CALENDERS——Static can present a spectacular performance on the rewind after calendering operations. In this case, the static charge on the cloth accumulates on the rewind roll to such an extent that a static arc of 3 to 4 inches is not uncommon. Operating personnel shocked with this sudden discharge have reported not only constant irritation and annoyance but also there is a constant accident hazard resulting from unexpected shock. In addition, an arc of this intensity passing through a roll of cloth can puncture the cloth where the arc passes through, while dust and lint attracted to the cloth frequently impair quality.

To overcome this difficulty, the calenders may be run at speeds substantially lower than full efficiency, or steam jets may be directed at the cloth before the rewind operation. Neither of these two methods is considered a satisfactory solution of the problem.

With the installation of electronic static controls on these machines, the problem of static is practically eliminated, so that the calenders may be operated on full speed without the arcing hazard and without any impairment of quality as a result of the static charge.

HOSIERY OPERATIONS —— In the hosiery industry static is a quality-impairment problem not only on hosiery boarding machines but on hosiery knitting machines as well. When stockings come from the knitting machines, they are loaded with static and are attracted to the operator's fingers or to any projecting surface. This attraction frequently results in snags and pulled threads, which would not occur if there were no static present. On some hosiery boarding machines stockings frequently refuse to fold and stack properly but instead flow off onto the floor picking up dust and dirt and becoming subject to snags.

To overcome both of these problems in the textile industry, electronic static controls installed on the boarding machines at the point where the stocking is removed from the form effectively controls the static difficulty on this operation. On hosiery knitting machines a static control bar installed the length of the machine so that the stocking passes over or under the bar as it is being wound up after the knitting operation helps substantially to overcome quality impairments of pulled threads and snags.

MISCELLANEOUS —— Time limitations restrict detailed discussion of static-control installations on other types of textile-processing operations. Highly successful installations have been made, however, on a number of other machines that are listed here:

slashers
inspection frames
sueders
garnetters
pickers
roving frames
spinning frames
coners
combers
rubber-thread machines, etc

ACKNOWLEDGMENT

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CONCLUSIONS

New types of textile fibers combined with greater operating speeds on all textile processing operations have caused the problem of static control to increase very sharply in intensity and severity in the past few years. It is expected that the severity of static problems will continue to increase in the future in the textile field.

The development of electronic controls operating under the principles of controlled diffuse discharge has increased the effectiveness of control over the problem of static in the textile industry. The availability of this new tool for production and quality control has given the textile engineer mastery over the problem of static and has permitted increased production speeds, greater uniformity of quality and less waste.

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DR HAROLD C CHAPIN
Lowell Textile Institute
Lowell, Massachusetts

30th Annual Convention
Finishing Group———

CHARACTERISTICS OF COTTON FABRICS PROCESSED IN CONTINUOUS PEROXIDE BLEACHING SYSTEMS*

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Electrochemicals Department
E I du Pont de Nemours & Co, Inc

N J Stalter

T E Bell

Sixteen samples of cotton piece goods from different important continuous peroxide bleaching installations have been analyzed in the grey, at intermediate stages, and after bleaching for various properties as follows: whiteness, fluidity, absorbency, content of noncotton ingredients, content of oils, fats and waxes, content of ash and pH values. The data are claimed to prove that the continuous peroxide bleaching of cotton piece goods produces satisfactory whiteness, whiteness retention, absorbency, and purity of cellulose without impairment of fabric quality. The function of the grey sour needs further study. Although the pH values of such goods are higher than those obtained in batch bleaching, the higher values do not adversely affect the final product.

INTRODUCTION

IT IS a privilege and a pleasure to have this opportunity of presenting to you the data we have collected in connection with a survey aimed at developing information that might lead to improvements in the chemistry and mechanics of the continuous peroxide bleaching system.

The commercial acceptance of continuous peroxide bleaching has been exceptional for a new process of this magnitude. More than 130 systems of all types have been sold of which more than 100 have been installed and are in operation. Although the exact total productive capacity is difficult to calculate, it is estimated that if the existing ranges were operated at an average speed of 200 yards a minute, 120 hours a week, bleaching four yard print cloths, there is sufficient capacity to bleach 170 million yards a week, or 9 billion yards a year.

This volume is just under the average annual production of cotton piece goods in the United States, which, until recent months, has been about 10 billion square yards. These figures leave little doubt that this process has become firmly established as the modern way to bleach cotton fabrics.

In collecting the samples used to develop the data upon which this report is based, we have had the co-operation of many important mills in the industry; at this time we wish to express our appreciation for their assistance without which this report could not have been written.

In selecting our data we have attempted to obtain information on all of the major items that we consider important enough to warrant consideration in a review of this type, the following having been considered in detail:

1. Whiteness
2. Whiteness Retention
3. Fluidity
4. Absorbency
5. Noncotton
6. Oils, Fats and Waxes
7. Ash
8. Washing Efficiency

Since the bleaching of cotton fabrics involves considerably more than merely whitening the goods, the term "bleaching" is used in the broad sense to include the purification of the fiber as well as the whitening process itself. As in almost all cases purification and whitening proceed concurrently, we feel that it is not possible to separate these two processes.

In order to get a satisfactory over-all picture of the continuous peroxide bleaching process as it is operated commercially, we have obtained samples of a rather wide variety of fabrics from a number of different mills. Since we are primarily concerned with the chemistry of the process, which is more or less independent of fabric construction, this does not affect the result obtained to any considerable degree.

All of the samples used in this study were obtained at plants which operate two-stage rope continuous peroxide bleach systems, the first step consisting of a caustic scour treatment and the second step of an alkaline-hydrogen-peroxide bleaching treatment. In all cases the cloth was singed before processing and desized before entering the caustic scouring part of the system. While it has been found that these preliminary treatments do affect the end result to some extent, the variation is not sufficiently great to warrant discussing them separately. It has also been found that small variations in the preliminary treatment, and also in the caustic scouring treatment, can be compensated for by making changes in the alkaline-peroxide bleaching treatment; for this reason the end results are surprisingly uniform even though there is a considerable variation in the manner in which the several steps of the process have been carried out.

COTTON PROPERTIES AFFECTED BY BLEACHING

WHITENESS AND WHITENESS RETENTION——Since the whiteness of the finished product is a quality that can be readily seen and easily measured, we have prepared a table (Table I) which indicates whiteness after bleaching, whiteness after

* Presented by T E Bell on October 19, 1951 in New York, N Y.

TABLE I

CLOTH WHITENESS

(% as compared with magnesium oxide)

Sample	*After Bleaching*	*After Aging*	*Loss*	*% Retention*
1	90.7	82.8	7.9	91.3
2	83.4	77.9	5.5	93.4
3	87.3	82.0	5.3	93.9
4	86.6	80.8	5.8	93.3
5	83.1	81.5	1.6	98.1
6	80.3	76.5	3.8	95.3
7	81.1	75.2	5.9	92.7
8	87.8	82.5	5.3	94.0
9	87.4	83.8	3.6	95.9
10	87.4	82.6	4.8	94.5
11	87.2	80.1	7.1	91.9
12	84.9	76.0	8.9	89.5
13	84.6	74.6	10.0	88.2
14	89.8	81.5	8.3	90.8
15	93.0	85.2	7.8	91.6
16	90.3	85.4	4.9	94.6
Average	86.6	80.5	6.0	93.1

aging, and percent whiteness retention of several cloth samples.

The figures reported in Table I were obtained by measuring the cloth brightness with a Hunter multipurpose reflectometer. Brightness readings were made with a blue filter in the light source, which gives the reflectometer a wave-length peak response of 458 millimicrons. This reflectometer is standardized against magnesium oxide, and all readings are direct. Results are expressed as percent whiteness compared with a magnesium oxide block.

After the whiteness had been recorded, the same samples were exposed to a saturated steam atmosphere at 15 psig for one hour in order to age the fabrics artificially, so that the loss in whiteness during this accelerated aging test could serve as a measure of the resistance of the bleached fabric to color changes in storage. This, of course, is not a direct measure of the changes to be expected but does indicate the relative stability of the samples tested.

It can be seen from Table I that the whiteness varies from a low of 80.3% to a high of 93.0%. While some of this variation results from differences in fabric construction, it is mainly due to variations in the scouring and bleaching process and is especially affected by the concentration of hydrogen peroxide in the bleaching step. Table I also shows that when the cloth is subjected to the accelerated aging test previously described, it reverts in color and the aged cloth varies from 74.6% to 85.4% in whiteness. This is equivalent to a whiteness retention of between 88.2% and 98.1% of the original bleached whiteness. A careful study of the table shows that, generally speaking, the fabrics which were whiter at the start and therefore could be presumed to have been more thoroughly bleached actually show a greater reversion than those fabrics that were not so well bleached originally. From the data so far obtained it has been impossible to draw any definite conclusions, and this part of the study will be extended until some correlation is established.

FLUIDITY——The determination of the fluidity of cellulose dissolved in cuprammonium hydroxide or cupriethylenediamine solutions is a very sensitive and accurate method for measuring the effect of bleaching upon the cotton fabric. It is particularly effective in measuring the modification or degradation of the cellulose due to chemical processing. Since this modification or degradation can be used to predict the effect of these chemical treatments on the tensile strength of fabrics and also to predict the wearing qualities of the fabrics, this has become a very useful test as it is largely independent of fabric construction and therefore truly mirrors the effect of the bleaching process on the fiber itself.

The fluidity values reported in Table II were determined in cupriethylenediamine (cuen) solution and were converted to the more commonly reported cuprammonium hydroxide (cuam) values to facilitate comparison with other published literature.

Table II shows the progressive changes in the fluidity of a number of typical fabrics as they pass through the continuous peroxide bleaching system. This table shows the fluidity of the grey cloth, which varies from 1.8 to 2.9, or an average of 2.2. The table shows that the fluidity of these same samples after desizing varies from 1.5 to 4.4. Since little or no chemical processing has taken place, this would seem to indicate that the original grey-cloth readings on samples 3, 4 and 5 were in error. This is not the case, however, since these samples received a grey souring treatment after the enzyme desizing treatment, which was received by all of the samples. We believe that this accounts for the increase in fluidity in these particular samples. As the average values after desizing for the samples that were desized with enzymes but not acid-treated is 2.1, we have here an indication that there has been little or no change in fluidity as a result of the desizing process.

Fluidity was measured again after the caustic scouring treatment, in which the cloth was subjected to caustic soda varying from 3% to 5%, based on the dry weight of the fabric, at a temperature of about 210°F for one hour. If we again exclude the fluidity of samples 3, 4 and 5, we find that there has been little or no increase

TABLE II

FLUIDITY—CUAM VALUES

(in reciprocal poises or rhes)

Sample	*Grey Cloth*	*After Desizing Step*	*After Caustic Step*	*After Peroxide Step*
1	2.6	2.3	2.5	8.4
2	2.9	2.6	2.9	5.1
3	1.8	4.4	5.8	6.5
4	2.0	4.1	6.3	5.9
5	1.8	4.0	5.2	6.2
6	2.4	2.1	2.5	4.4
7	2.6	2.8	2.1	2.8
8	1.9	1.7	1.8	4.0
9	1.8	1.8	2.0	5.0
10	2.0	1.7	1.6	5.4
11	2.0	1.9	2.0	7.2
12	2.0	1.5	1.6	2.5
13	2.1	1.8	1.9	2.4
14	2.5	2.7	3.2	8.2
15	2.5	2.7	3.3	7.3
16	2.0	2.2	2.4	2.7
Average	2.18	2.52	2.94	5.25

in fluidity due to the caustic treatment since the average is 2.3 as compared with the average fluidity of the grey cloth of 2.2 and of the desized cloth of 2.1.

Examining the fluidities of the completed samples, which were measured after the peroxide bleaching step, we find that the average fluidity has been increased to 5.3. We also find that there is a comparatively wide variation between the lowest fluidity of 2.4 and the highest fluidity of 8.4. Most of the samples fall within the limits of 5-10 rhes, a range of values that is considered normal for scoured and bleached fabrics in accordance with the classification of the British Research Committee of the Department of Scientific and Industrial Research. The samples having fluidities between 2.5 and 5.0 may be classified as very mildly prepared.

As to the significance of the fluidity values, experience seems to indicate that the best over-all bleaching results are obtained when the fluidity of the finished fabric falls between 4.0 and 6.0. In general, if fluidity values are below 4.0, the fabric is likely to be less absorbent and not thoroughly prepared for subsequent finishing operations. Values above 6.0 may indicate that the cloth has received more bleaching than is absolutely necessary for most purposes. There are exceptions, however, since in cases where it is necessary to produce extremely good whites the amount of hydrogen peroxide required to produce these high whiteness readings also increases the fluidity. We have found no cases where fluidity exceeded the limit of 10, which is generally accepted as the point at which chemical degradation sufficient to affect the tensile strength of the fabric begins to be apparent.

ABSORBENCY——In addition to whiteness and fluidity, the absorbency of bleached fabric is also a measure of the completeness of the bleaching process. In the case of a number of fabrics, absorbency determines the suitability of the fabric for particular uses. This is especially true of gauzes and toweling. It is also important in fabrics that are to be dyed since the completeness of the dyeing can be affected by the absorbency. It should be pointed out, however, that, as far as dyeing is concerned, it is more important for the fabric to be uniformly bleached and uniformly absorbent than it is for it to have any definite and absolute absorbency. For example, grey goods can be dyed satisfactorily if they are uniform even though the absorbency is relatively low, whereas highly absorbent fabrics cannot be dyed satisfactorily unless they are uniformly absorbent.

For determining the absorbency of the fabrics tested the AATCC method of dropping distilled water on the surface of the sample was used *(2)*. An absorbency of five seconds is generally accepted as satisfactory. The samples were tested for absorbency after the caustic scouring treatment and again after the peroxide bleaching treatment. The figures given are averages of 10 determinations made on each sample tested.

TABLE III

ABSORBENCY

Sample	*After Caustic Step seconds*	*After Peroxide Step seconds*
1	0.9	2.0
2	0.6	0.8
3	5.6	5.0
4	5.4	4.1
5	3.4	3.2
6	13.1	3.0
7	55.8	11.3
8	20.0	7.2
9	0.4	0.3
10	0.6	0.4
11	6.0	0.9
12	7.0	1.7
13	23.0	0.5
14	300.0	2.6
15	300.0	2.1
16	29.0	2.6
Average		2.98

It will be noted that, after singeing, desizing and caustic scouring, the absorbency of the fabrics tested varied from 0.4 second, which is extremely good, to about 300 seconds, a value that can be considered poor. Following the peroxide bleaching treatment these samples were again tested and showed a variation in absorbency from 0.3 seconds to 11.3 seconds. It will be noted that sample No. 9, which had an absorbency of 0.4 seconds, improved further during the bleaching process and had a final absorbency of 0.3 seconds, whereas samples No. 1 and No. 2 were slightly less absorbent after the bleaching step than after the caustic step. Samples No. 14 and No. 15, which showed lowest absorbency after the caustic treatment, were greatly improved and had a final absorbency value of 2.6 and 2.1 seconds, respectively. The average of the 16 samples tested after bleaching was 3.0 seconds, a value that is well within the limit of 5 seconds, which is considered satisfactory. There are a number of odd results in this table, which prevent us from drawing any firm conclusions from the data presented. When additional data are available, it is hoped that a clearer relationship between the method of processing and the end result as measured by the absorbency of the finished fabric will be indicated.

NONCOTTON CONTENT——Another measure of the completeness of the purification and bleaching processes to which a given fabric has been subjected is the percent of noncotton content (which includes oils, fats, and waxes) remaining in the fabric after processing.

To measure the effect of processing, samples of the grey goods, the desized fabric, and the bleached fabric were analyzed. The oils, fats, and waxes were determined by extracting the cloth samples with carbon tetrachloride for two hours in a Soxhlet extractor having a minimum of six siphonings per hour.

After extraction, the noncotton content was determined by first air-drying the samples, then immersing them in a 2% enzyme solution (Rapidase) for one hour at

TABLE IV

NONCOTTON CONTENT

(Including Oils, Fats and Waxes)

Sample	*Grey Cloth*	*After Desizing (washed)*	*After Caustic Step (washed)*	*After Peroxide Step (washed)*
	%	%	%	%
1	9.08	1.02	0.76	0.55
2	9.62	1.19	0.98	0.61
3	7.41	0.83	0.28	0.22
4	7.16	0.85	0.43	0.16
5	10.06	1.11	0.54	0.18
6	7.88	2.05	1.28	0.51
7	11.54	2.92	1.53	0.67
8	9.92	2.43	1.09	0.45
9	8.97	1.92	0.41	0.20
10	7.25	1.69	0.36	0.17
11	13.14	2.80	0.92	0.25
12	11.13	1.80	1.15	0.64
13	12.61	2.78	1.37	0.41
14	9.07	3.74	3.43	0.37
15	11.24	4.55	0.74	0.34
16	12.35	3.40	0.62	0.57
Average	9.9	2.19	0.99	0.39

TABLE V
CONTENT OF OILS, FATS, & WAXES

Sample	Grey Cloth	After Desizing (washed)	After Caustic Step (washed)	After Peroxide Step (washed)
	%	%	%	%
1	0.87	0.62	0.23	0.35
2	0.83	0.75	0.67	0.35
3	0.44	0.36	0.12	0.02
4	0.55	0.18	0.11	0.01
5	0.56	0.70	0.14	0.02
6	0.90	0.81	0.46	0.29
7	1.04	1.12	0.88	0.55
8	0.70	0.88	0.27	0.32
9	0.74	0.85	0.38	0.20
10	0.48	0.53	0.26	0.16
11	1.11	0.88	0.38	0.12
12	0.60	0.64	0.55	0.25
13	1.00	1.04	0.44	0.27
14	1.15	0.98	0.91	0.23
15	1.13	1.19	0.55	0.23
16	1.04	0.80	0.45	0.44
Average	0.82	0.77	0.43	0.24

TABLE VI
ASH CONTENT

Sample	Grey Cloth %	Bleached Cloth %
1	1.00	0.08
2	0.79	0.14
3	1.29	0.15
4	0.93	0.19
5	1.07	0.19
6	0.83	0.21
7	0.87	0.18
8	1.02	0.16
9	1.07	0.31
10	1.01	0.14
11	1.02	0.22
12	0.99	0.30
13	0.95	0.23
14	0.97	0.14
15	0.90	0.06
16	1.08	0.18
Average	0.99	0.18

TABLE VII
pH OF CLOTH SAMPLES

Sample	After Caustic Step	After Peroxide Step
1	7.0	6.7
2	7.4	6.9
3	8.8	8.1
4	8.7	8.2
5	8.6	8.2
6	10.2	8.8
7	9.9	8.8
8	10.0	8.5
9	10.0	9.1
10	10.0	9.1
11	9.9	9.9
12	10.0	9.5
13	9.8	9.6
14	—	7.9
15	—	8.1
16	—	8.5
Average	9.3	8.5

180°F. The samples were then rinsed thoroughly, dried, and weighed.

From Table IV it is observed that the grey cloth has an average noncotton value (including oils, fats and waxes) of 9.9%. After the desizing operation, the noncotton value has been reduced to an average of 2.19%, with a high value of 4.55% and a low value of 0.83%. The noncotton content was still further reduced by the caustic treatment, the average of 16 samples being 0.99%, with a high of 3.43% and a low of 0.28%. A further reduction takes place in the peroxide bleach step, and the finished fabrics were reduced to an average of 0.39%, with a high figure of 0.67% and a low of 0.16%.

The conclusion we have drawn from these analyses is simply that almost any desired degree of purification can be obtained in the continuous peroxide bleach process without adversely affecting th fabric as measured by the fluidity values previously reported.

CONTENT OF OILS, FATS, WAXES ——The values for content of oils, fats and waxes in percent obtained on grey cloth, desized cloth, caustic treated and bleached cloth are recorded in Table V. The grey-cloth average is 0.82%, the high value, 1.15% and the low value, 0.44%. These figures agree well with those of other observers *(1)*. The cloth after desizing has an average of 0.77%, indicating, as might be expected, that desizing and grey-souring operations have little effect upon waxy components.

The cloth after caustic scouring has an average value of 0.43%, or about 50% less than the original grey value. This, of course, is to be expected.

The same fabric after the peroxide treatment has an average value of 0.24%, a high of 0.55% and a low of .01%. An unusual conclusion may be drawn from the wide variation in results. Samples 3, 4 and 5, which have the extremely low values of 0.02% and 0.01% and 0.02% respectively, were enzyme-desized and grey-soured. The rest were enzyme-desized only. It is possible that either 1) the souring operation actually conditions these waxy impurities so that they are more easily affected by subsequent operations, or that 2) the analytical procedure used measured more than just oils, fats, and waxes in the samples that were not grey soured.

ASH——To complete our study of cloth characteristics, the ash content of the grey and the bleached samples was determined. The grey-cloth average, as given in Table VI, is 0.99%, with a high of 1.29% and a low of 0.79%. These figures agree well with other analyses and serve as a check on the methods used. After bleaching, the average ash content of 16 samples was 0.18%, and varied from a low of 0.06% to a high of

TABLE VIII
AVERAGE CLOTH CHARACTERISTICS

	Grey	*Scoured*	*Bleached*
White, % vs MgO	—	—	86.6
White (aged), %	—	—	80.5
Whiteness Retention, %	—	—	93.1
pH of Water Extract	—	9.3	8.5
Fluidity, rhes	2.2	2.9	5.3
Absorbency (in seconds)	—	—	3.0
Noncotton, %	9.9	0.99	0.39
Oils, Fats & Waxes, %	0.82	4.43	0.24
Ash, %	0.99	—	0.18

0.31%. By contrast with the determination of oils, fats, and waxes, the method of desizing apparently has no effect on the ash content. Samples 3, 4 and 5, which were soured, have ash values of 0.15, 0.19 and 0.19%, respectively, and average 0.177%, which is almost identically the same as the over-all average of 0.18%. This is somewhat surprising, since the souring operation generally is considered helpful in lowering the ash content. In view of the results noted in Tables V and VI a re-examination of the function of the acid sour might be worthwhile.

In connection with this process study, some consideration was given to the effectiveness of washing the cloth after both the caustic and the peroxide J-box treatments. The samples tested came from plants that use all the common types of washers, and process water which varies in pH from 6.5 to 7.2. The cloth samples were boiled for one-half hour in 20 times their weight of distilled water. The water was cooled to room temperature, and the pH was determined with a Beckman pH meter. Table VII shows the values obtained.

From an analysis of the results it appears that the pH values of the cloth after bleaching were somewhat higher than has generally been considered desirable. It is well known that the presence of alkali in bleached goods will cause yellowing during the drying operation. An examination of samples 11, 12 and 13, which had pH values after bleaching between 9.5 and 9.9, showed that the whiteness retention figures were on an average lower than on any of the other samples tested. However, the pH value of bleached samples is not the only factor that influences whiteness retention values since samples 1 and 2, which had pH values of 6.7 and 6.9, had whiteness retentions of 91.3 and 93.4%. These figures compare with the over-all average of 93.0% retention for all the samples tested.

It can be concluded from the results in Table VII that good results in whiteness retention can be obtained if the bleached cloth is washed to give pH value of about 8.5%.

To summarize the results of this work, we have prepared Table VIII, which shows the average characteristics of cloth processed in the continuous peroxide bleaching system.

SUMMARY

It is extremely difficult to draw broad generalizations from the data obtained in this survey. Certain aspects which stand out, however, should be given consideration when studying the continuous peroxide bleaching process. These observations are as follows:

I. The continuous peroxide bleaching process will produce satisfactory whiteness and whiteness retention on aging, the absolute whiteness being largely dependent upon the percent of hydrogen peroxide used in the bleach solution.

II. In achieving commercially acceptable whiteness values, the fiber is not damaged, as determined by fluidity measurements.

III. A satisfactory absorbency can be attained, both the caustic treatment and the peroxide treatment being important and mutually helpful. This allows considerable processing flexibility, i e, a poor absorbency due to low-caustic scouring can be improved by increased peloxide concentrations, and vice versa.

IV. Noncotton values are generally in line with accepted values.

V. The amount of oils, fats, and waxes remaining in the goods is slightly less than in other processes. No general significance can be attached to this value, although absorbency and whiteness retention are probably affected to some extent by abnormally high values.

VI. The function of the grey sour needs further study. It seems to have little or no effect upon the ash content, but a definite effect upon oils, fats, and waxes, which would affect the absorbency and whiteness indirectly.

VII. The pH values of goods bleached in the continuous bleaching systems are somewhat higher than the pH values of the corresponding process waters but have little if any effect upon the resulting whiteness of the bleached cloth after aging.

In conclusion, we feel that some new light has been shed upon a number of the chemical variables in the continuous peroxide bleaching process, and that a further study should be made to define more accurately the effect of these variables upon the final product.

As a general observation, we would like to point out that, after start-up, any continuous peroxide bleaching range requires many adjustments to produce commercially satisfactory results. By proper attention to the effect of the variables studied and reported herein, the chemistry of the processing can be improved and, in many cases, the costs of processing lowered.

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(2) *1951 AATCC Tech Manual & Year Book,* p 141.

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CORPORATE

Worth Chemical Corp.
Bersworth Chemical Co.

APPLICATIONS FOR TRANSFER TO SENIOR MEMBERSHIP

J L Johnson *G W Spicer*
J M McChesney, Jr.

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Philadelphia Section Meeting Report

Kugler's Restaurant, Philadelphia, Pa
January 18, 1952

AT A MEETING of the Philadelphia Section in Kugler's restaurant, Philadelphia, on Friday evening, January 18, 1952, Chairman Edward C Diehl presented a pair of traveling bags to A E Raimo, outgoing Chairman, on behalf of the Section. W F Luckenbach, Jr of Virginia Smelting Co spoke on "Sell for America." Albert C Nuessle, Rohm & Haas Co, who was introduced by Thomas H Hart, chairman of the Program Committee, presented the prize-winning Intersectional Contest paper, "Some Variables in Improving the Crease-Recovery of Cotton Fabrics with Synthetic Resins".

116 attended the dinner, and 156, the technical session that followed. Among the guests were Joseph H Jones, councilor from the Mid-West Section, and John McLuckie, Jr, chairman of the Philadelphia Textile Institute Student Chapter.

Respectfully submitted,
THOMAS J SCANLON, *Secretary*

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WNE Section Changes Meeting Site

AS NYQUIST, secretary of the Western New England Section, has announced that the location of the Section's March 14th meeting has been changed from Danbury, Conn, to Rapp's Restaurant, Shelton, Conn. D D Gagliardi, Warwick Chemical Company, will be the guest speaker.

Textile Fibers——

(Concluded from Page P104)

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(19) Waters, E, *J Soc Dyers Colourists* **66**, 609 (1950).

(20) Thomas, R J, Meunier, P L, *Am Dyestuff Reptr* **38**, 925 (1949).

(21) Woodruff, R A, *ibid* **40**, 402 (1951).

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(26) Feild, T A, Fremon, G H, *Textile Research J* **21**, 531 (1951).

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DISCUSSION

Question: Are any data available on the effect of carriers, especially solvents, on the tensile strength of synthetic fibers?

Answer: I have not yet seen any published data, but at a meeting in Rhode Island last winter the subject was brought up. Too much carrier or solvent will have a tendency to dissolve fibers and may well reduce fiber strength.

Q: Are carrier solvents sufficiently volatile to be completely removed in drying?

A: The most widely used carrier solvent is p-phenylphenol, which is not readily volatile. This carrier is most effectively removed by an efficient scouring.

Q: What are the temperature limitations in dyeing Dacron and Orlon

A: Dacron melts at about 450°F but can be processed at 430° without damage. Orlon and Acrilan, unfortunately, tend to yellow at high temperatures, and this yellowing may seriously effect the shade, especially for light bright colors. Little yellowing of these fibers takes place at 350°F.

Q: Has it been proved that high temperature alone promotes the dyeing of Orlon, Dacron, or nylons and that pressure has no effect?

A: I cannot answer that question definitely, but I assume that pressure is only necessary to attain high temperature, Dyeing experiments in some kind of bomb could be used to determine if pressure alone has any effect when the temperature is kept below 212°F.

Meeting Report—— Western New England

December 14, 1951
Rapp's Restaurant, Shelton, Conn

A MEETING of the Western New England Section was held on December 14, 1951 at Rapp's Restaurant, Shelton, Connecticut.

An early season snowfall, which made driving treacherous and paralyzed automobile travel, held down the attendance. Those who were able to attend were rewarded with an excellent illustrated talk on "Color Facts and Fantasies" presented by Dr E I Stearns, Calco Chemical Division, American Cyanamid Company.

Respectfully submitted,
A S NYQUIST, *Secretary*

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Meeting Report—— Pacific Southwest

January 11, 1952
Nikabob Cafe, Los Angeles, Cal

THE Pacific Southwest Section held a quarterly dinner meeting on January 11, 1952, at the Nikabob Cafe in Los Angeles. The speaker was Giles E Hopkins, technical director of the Wool Bureau, Inc, on "Wool Research in the World". Candidates for Section officers were offered by the Nominating Committee and an additional nomination was made from the floor. Forty members and guests were present.

Respectfully submitted,
JUNE ERICSON, *Secretary.*

Meeting Report—— Utica Technical Institute

January 28, 1952
Utica, New York

THE Utica Technical Institute Student Chapter met on January 28, 1952. Reports were read and the privileges and duties of membership described for the benefit of new and prospective members. Presentation of a paper in the contest at the Boston convention was discussed. A program committee was appointed.

Respectfully submitted,
NORMAN R THOMPSON,
Secretary

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Meeting Report—— North Carolina State College

January 16, 1952
Raleigh, N C

THE North Carolina State College Student Chapter held its regular monthly meeting on January 16, 1952 at 7:30 p m. A short business session was followed by an address by Arthur Thompson of the Charlotte Office, Ciba Company, Inc. His subject was, "It's Entirely Up to You." Afterwards, Mr. Thompson put on a magic show.

More than sixty persons attended the meeting.

Respectfully submitted,
R F MILLER, *Secretary*

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NNE Section to Meet at MIT on March 7

PROFESSORS E R Schwarz and Stanley Backer of Massachusetts Institute of Technology's Textile Division will highlight the afternoon session of the March 7th meeting of the Northern New England Section, which will be held at MIT (Cambridge, Mass). Their subject will be on the handling of statistical data and will be entitled, "Danger—Curves Ahead".

The subject of the evening session, "Engineering Properties of Textiles" (From Fiber to Fabric), will be delivered by members of the Fabric Research Laboratories, Inc.

A question and discussion period will be held after both sessions.

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Leonard, Baxter to Speak at N Y Section Meeting on Feb 29th

THE next meeting of the New York Section will be held on Friday evening, February 29th, 1952, at the Hotel McAlpin, New York City at 8:15 pm.

Edmund A. Leonard, Alexander Smith & Sons Carpet Co, will present the paper which took first prize in the Intersectional Contest held during the 30th National Convention in New York, "The Measurement of Fabric Soiling".

George L Baxter, Bradford Dyeing Association, will report on "Corporate Memberships". Mr Baxter is Chairman of the National Corporate Membership Committee and will discuss the need of corporate memberships and the role of the individual member in obtaining them.

• PATENT DIGEST •

PAUL WENGRAF

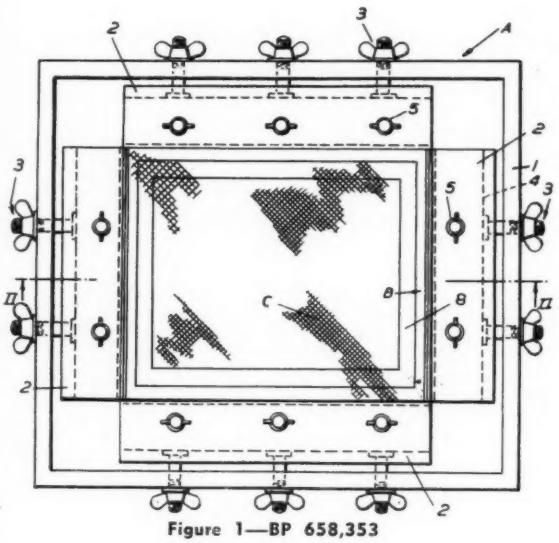


Figure 1—BP 658,353

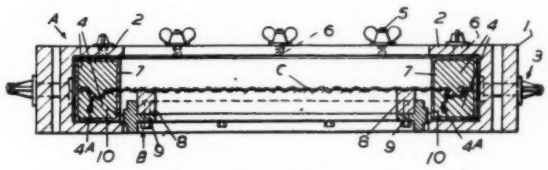


Figure 2—BP 658,353

NOTE

The accompanying illustrations were inadvertently omitted in the February 4th issue. They will serve to supplement the discussion of British Patent 658,353 "Silk Gauze Mounting Device", which appeared on page 88.

DYEING CHROME-COMPLEX ACID DYES——Lower Alkanesulfonic Acids Used C, 4, 06

U S Pat 2,572,954
(Standard Oil Co——Schwartz——
Oct 30, 1951)

Acid dyebaths containing high amounts of sulfuric acid are known to damage the wool substance in prolongated boiling. This damage can be detected by an increased solubility of the fiber in alkalis and by a decrease in tensile strength. It is obviously desirable to reduce the acid concentration in wool dyeing operations and many suggestions have been offered up to this time. Although the disadvantages that occur in hot acid treatments may apply to any category of acid wool dyes, the drawback is especially conspicuous when the dyestuffs of the azo-chrome-complex group (which require amounts of 10% or more sulfuric acid) are used. These dyes are best exemplified by the Chromacyl group (Du Pont) and the Neolan group (Ciba).

The inventor found that lower alkanesulfonic acids, containing chains of C_1-C_4, are more effective in exhausting acid dyebaths of this type than sulfuric acid. The alkanesulfonic acids used in this process are prepared through the catalytic oxidation of the corresponding alkyl disulfides by a treatment with air in the presence of catalytic amounts of nitrogen oxides. This is described in Proell's U S Pat 2,433,395 (see references).

Dyes applied according to this specification include Chromacyl Bordeaux R and Chromacyl Yellow N (Du Pont) and Neolan Red 3 B (Ciba). Wool flannel was first immersed in cold water and 1-8% of the alkanesulfonic acid mixture (containing some free sulfuric acid) was added. After standing for a short time, the dye solution was introduced at 100° F, the bath was brought to the boil within ½ hour and boiling was continued for another 1½ hours. The alkali solubility and the loss of tensile strength were less than in specimens treated with sulfuric acid only. To obtain the same shade, less alkanesulfonic acid was needed compared with sulfuric acid. For example, 4-8% of sulfuric acid was required to attain the same results accomplished with 1-3% of alkanesulfonic acid. Equally favorable results were noted when the resistance to chlorine in shrink-control processes was compared, and the color- and light fastnesses were generally superior.

A special advantage is attained when wool that is to be dyed is first pretreated with active chlorine according to the "Harriset" method (cf *Am Dyestuff Reptr 38*, 522, 1949), covered by U S Pat 2,466,695. This process increases the affinity to dyes. A smaller amount of sulfuric acid (about 4%) considerably increases the alkali solubility of the "Harriset" pretreated material. It has been found that 1% of alkanesulfonic acid is sufficient to dye this fiber with the same effect otherwise obtained with 4% of sulfuric acid. Dyeing in the presence of this small amount of alkanesulfonic acid does not appreciably increase the alkali solubility of the chlorine pretreated wool.

References cited by the Patent Office:

U S Pat 2,433,395 (Standard Oil—Proell/1947): the oxidation of disulfides (R-S-S-R′) to sulfoxides (R-SO-S-R′), further, to sulfones (R-SO-SO-R′) and finally, to sulfonic acids (R-SO_2-SO_2-R′), which are hydrolyzed to the monosulfonic acids RSO_3H and $R'SO_3H$.

U S Pat 2,433,396 (ibid): organic sulfur compounds (such as dimethyldisulfide or other low alkylsulfides) obtained from light naphtha fractions are oxidized by free oxygen contained in the air and small amounts of NO, NO_2, N_2O_3, N_2O_4 or N_2O_5 to the corresponding alkane sulfonic acids. The compounds may be used in electroplating or as tanning agents, laundry sour, or (optionally) acid cata'ysts.

U S Pat 1,864,718 (Chem Fabr Heyden /1932): carbonizing wool with aromatic sulfonic acids, e g, toluene sulfonic acid or naphthalene sulfonic acid, instead of sulfuric acid, which is generally used for carbonizing.

DYEING POLYESTER FIBERS (DACRON) with Acetate Dyes ——Steam Aftertreatment C 4, 07

Brit P 659,667
(Stevenson Dyers Lim—Partridge, et al—— Oct 24, 1951)

It is known that polyester fibers (e g, Dacron — polyethylene terephthalate) have poor affinity to dyestuffs in general.

The inventors have observed that the polyester fibers can be dyed with water-insoluble acetate dyes in a manner analogous to that for cellulose acetate (Brit P 609,943). An improvement of this method has been found in aftertreating the dyed polyester fibers with steam under a pressure of 10-40 lbs/sq in. Better solution and penetration of the dye particles result through this aftertreatment.

Example: Ladies hose, knitted from polyethylene terephthalate yarn, is dyed in a soap dispersion of Dispersol Fast Yellow G 150, Dispersol Fast Scarlet 150 and Duranol Brilliant Blue BN 300 at 80° C for an hour, after which it is rinsed, squeezed and treated on the forms in a preboarding machine for 2 minutes with steam at a pressure of 25 lbs/sq in.

The aftertreatment of nylon, dyed with acetate dyes, has been described in U S Pat 2,474,890 (Celanese, cf *Am Dyestuff Reptr 38,* 756, 1949). It is interesting to note that an analogous method gives improved results on Dacron fibers.

The dyeing of synthetic fibers such as Fiber V (Terylene or "Dacron"), Orlon, nylon, etc, by the "Thermosol" process is discussed in du Pont's "Technical Bulletin" 1949, 82.

PIGMENT DYEING AND PRINTING——Styrene-Maleic Anhydride Copolymers C 4, 07

Brit P 659,078
(Monsanto Chem Co——Oct 17, 1951)

Pigment fixing methods as described in earlier references comprise the use of either customary printing adhesives (starch, albumen, casein, etc) or resin condensates (melamine- or urea-formaldehyde, alkyd resins) as binders. Both methods are said to be unsatisfactory; pigments applied with casein- or starch thickeners have poor fastness to crocking and resin emulsions that are thinned with solvents may develop dangerous vapors; moreover, amino resins require high curing temperatures.

This patent recommends the use of copolymers of styrene (or substituted styrene) with maleic anhydride (or a partial ester thereof) in the form of their water-soluble or water-dispersible ammonium or amine salts. By heating these salts to 225-325° F, the copolymer becomes insolubilized and firmly adheres to the fiber. A very durable effect is obtained by adding small amounts of formaldehyde (10-20% of the copolymer). Amino-resins may also be incorporated into this composition. The curing temperature of this mixture is given as 240-325° F (below the regular curing point of amino resins). It is assumed that cross-linking takes places in this event.

Another method for increasing permanency of the preparation comprises an aftertreatment with solutions of heavy metal salts, e g, aluminum formate, applied by dipping, padding or spraying.

The pigment-containing pastes can be printed according to any of the known standard methods. The examples cite a number of dyeing processes in which the fabric is immersed in the pigment-resin dispersion. For instance, a styrene-maleic anhydride copolymer is mixed with aqueous ammonia and stirred at 200-212° F until a viscous transparent solution is formed. The solution is then mixed with an iron-red pigment (5X Red G—Aridye Corporation). Samples of a mosquito netting and cotton or spun rayon fabrics were immersed in this pigment suspension, predried at 180° F and heated for 5 minutes to 260° F to insolubilize the ammonium salt of the copolymer. The pigment-dyed fabrics were fast to washing and crocking.

The preamble to this specification enumerates various resin-compositions that have been previously recommended for binding pigment compositions. Ger P 749,396 (I G Farben Ind—cf *Am Dyestuff Reptr 35,* 460, 1946) describes a pigment fixation with polyvinyl resin-formaldehyde condensates. Styrene copolymers apparently have not been used for this purpose.

COMING EVENTS

ACHEMA X
Exhibition Meeting for Chemical Engineering May 18-25, Frankfort/M, Germany.

AMERICAN CHEMICAL SOCIETY
7th National Chemical Exposition Sept 9-13, Chicago Coliseum, Chicago, Ill.

AMERICAN SOCIETY FOR TESTING MATERIALS
Spring Meeting and Committee Week, March 3-7, 1952, Cleveland, Ohio.

Annual Meeting, June 23-27, 1952, New York, N Y. (The biennial Apparatus and Photographic Exhibits will be held in conjunction with this meeting).

1953—Spring Meeting (Hotel Statler, Detroit, Mich.)

Annual Meeting (Chalfonte-Haddon Hall, Atlantic City, N J.)

1954—Spring Meeting (Shoreham Hotel, Washington, D C)

Annual Meeting (Sherman Hotel, Chicago, Ill.)

AMERICAN STANDARDS ASSOCIATION
3rd National Standardization Conference, Sept 8-10, Museum of Science and Industry, Chicago, Ill.

34th Annual Meeting, November 19, Waldorf-Astoria, New York N Y.

BRITISH INDUSTRIES FAIR
May 5-16, London and Birmingham, England.

CANADIAN ASSOCIATION OF TEXTILE COLOURISTS AND CHEMISTS
Annual Meeting (Quebec Section) April 25-26, Mount Royal Hotel, Montreal, Que.

CANADIAN TEXTILE SEMINAR
September, Queens University, Kingston, Ont.

CHICAGO INTERNATIONAL TRADE FAIR
Mar 22-April 6, Navy Pier, Chicago, Ill.

FIBER SOCIETY
Meeting: April 16-17, 1952 (Clemson House, Clemson, S C); Sept 10-11 (Princeton, N J).

NATIONAL ASSOCIATION OF HOSIERY MANUFACTURERS
41st Knitting Arts Exhibition, April 27-May 1, 1953, Atlantic City Auditorium, Atlantic City, N J.

NATIONAL KNITTED OUTERWEAR ASSOCIATION and UNDERWEAR INSTITUTE
Knitting and Allied Crafts Exposition, April 21-25, Grand Central Palace, New York, N Y.

NATIONAL ASSOCIATION OF TEXTILE MACHINERY MANUFACTURERS
Exhibit of American Textile Machinery, April 26-May 1, 1954, Atlantic City Exhibition Hall, Atlantc City, N J.

NEW YORK BOARD OF TRADE
26th Annual Dinner of the Drug, Chemical and Allied Trades: March 6, 1952.
26th Annual Meeting: September 25-28, Pocono Manor Inn, Pocono Manor, Pa.

PHI PSI FRATERNITY
49th Annual Convention, May 1-3, Clemson House, Clemson, S C.

SOCIETE DE CHEMIE INDUSTRIELLE
25th International Congress for Industrial Chemistry, May 18-25, Paris, France.

SOCIETY OF PLASTICS INDUSTRY, INC
5th National Plastics Exposition, Mar 11-14. Convention Hall, Philadelphia, Pa.

TEXTILE INSTITUTE
Annual Conference, June 2-6, Edinburgh, Scotland.

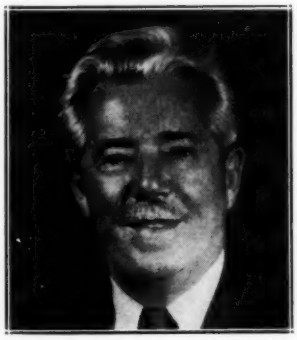
NEWS

The Van Vlaanderen Machine Company as it appeared in 1902 (upper left) and as it appears today.

• Van Vlaanderen Adds Manufacturing Space

Peter Van Vlaanderen, on the occasion of his 50th year in the textile machinery business, has revealed plans for the expansion of plant facilities of the Van Vlaanderen Machine Company, Paterson, N J. More manufacturing space has been added and more land purchased for further expansion as new space is required.

Mr Van Vlaanderen points out that the step was taken after a careful study of trends in the textile processing industry. He has stated, "The increasing use of synthetics, both by themselves and in blends with rayon and the natural fibers, promises a new growth on this segment of the textile industry similar to the growth of rayon beginning in the twenties".



Peter Van Vlaanderen (1951)

• Over 350 Attracted to 3rd FDC Symposium

The third annual Textile Symposium, sponsored by the textile classes of Fairleigh Dickinson College, Rutherford, N J, attracted more than 350 people from metropolitan New York on January 23rd with a program devoted to "Colors and Chemicals".

Featured speaker of the evening was Dr Henry E Millson, assistant director of the Dye Application Laboratories of the American Cyanamid Company, Calco Chemical Division. Dr Millson supplemented his talk on color with numerous interesting demonstrations.

Other features of the program included the welcoming remarks of Dr Ray A Miller, dean of Fairleigh Dickinson, and Herbert Mauersberger, director of the Textile Department; a color and sound film "Portrait of an Industry"; and a student demonstration and discussion on the subject of flameproofing of textiles. In the demonstration, a brushed rayon "torch" sweater of the type so recently in the news was ignited; however, half the sweater was flameproofed in order to show the effectiveness of such chemical treatment. Student members who participated included Dr Sidney Weinstein, research chemist at Apex Chemical Co, Murray L Hurwitz, chemical engineer at Apex, Leanore Glasser, Vogue Patterns, and Mabel Southwick, Rosenau Fabrics. L A Fluck of American Cyanamid's Pyroset Division and Dr H E Hager, technical director of the General Dyestuff Corporation joined the students in a discussion of the subject based on questions from the audience.

Educational exhibits of local industries supplemented the program. Those on display included Royce Chemical Co, Carlton Hill, N J; Calco Chemical Division, Bound Brook, N J; National Aniline Division, New York, N Y; Geigy Company, New York, N Y; General Dyestuff Corporation, New York, N Y; Interchemical Corporation (Textile Colors Division), Hawthorne, N J; Standard Chemical Products, Hoboken, N J; and Jacques Wolf & Company, Passaic, N J.

Fairleigh Dickinson College presented a large collection of fine French silk and wool fabrics from Jan 7 to 18, a presentation to American university professors who toured Europe last year. The rare exhibit was loaned by Professor Doris Myers of the Carnegie Institute of Technology and includes 83 different fabrics.

• G E Announces New Printing Vehicle

A new textile printing vehicle that reportedly gives unparalleled color strengths by keeping pigment particles apart, and thereby restraining them from clustering, has been announced by General Electric's Chemical Division.

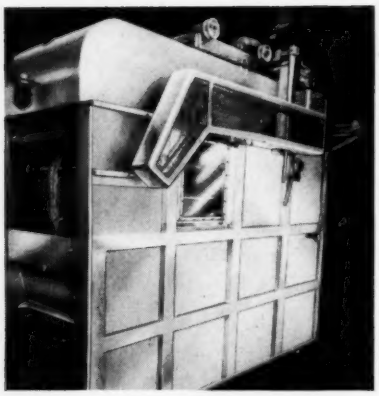
Important savings in pigments are reportedly made possible with the high color yields of the new vehicle, labeled G-E Glyptal alkyd resin 91033. It is claimed that when green and blue pigments (the phthalocyanine colors) are used with the new resin, only half the amount of pigment is required to get a color intensity equal to that obtained with conventional resins. The new vehicle is said to also prevent pigment particles from running into the spaces between the fibers of the cloth and so contribute to the sharpness of the priniting job. Prints made using 91033 are reported to have exceptional wash and crock fastness.

Emulsions made with 91033 are said to be stable during printing and on 48-hour storage, to be easy flowing, and to have low penetration into cloth. The manufacturer points out that many varieties of pigments, salts, additives and solvents can be used with 91033.

• Out-of-Print Books Wanted

Dr Daniel P Norman, Director of Chemical Research, New England Spectrochemical Laboratories, County Road, Ipswich, Massachusetts is seeking a copy of "Wool Quality" by S G Barker (London, 1931) and a copy of "Textile Microscopy" by J M Preston (London, 1934). Both of these books are out of print and cannot be obtained through book dealers. Persons who have copies of these books for sale should contact Dr Norman.

• Rodney Hunt Introduces "52" Dye Beck



Rear view of Rodney Hunt's new Series "52" Dye Beck.

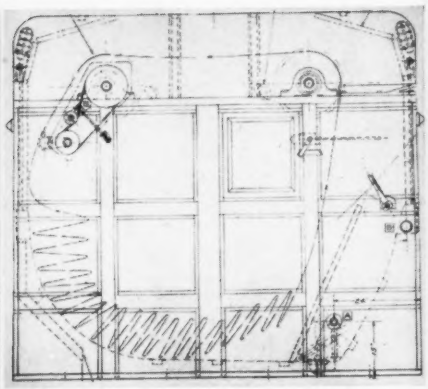


Diagram of Series "52" Dye Beck outlining new Dual Reel and Plaitor cloth handling system.

Steam going up and away from operator's face illustrates one of the advantages claimed for the "52" Dye Beck's new door design.

Commercial operation of the first of the Rodney Hunt Machine Company's new line of Series "52" Dye Becks* has begun, it is reported, based on extensive tests in which the "52" has successfully processed a full range of fabrics from heavy felt to nylon tricot.

A dual reel and plaitor cloth handling system takes the place of an oval reel in this machine, which, the company claims, prevents slippage or surging (and thereby greatly minimizes cloth damage). In the "52", the need for a wrapping reel is eliminated.

Two driven round reels are synchronized to carry the cloth in an even, tensionless manner, and a crank-type plaitor (located beneath the back reel) serves to control plaiting to desired lengths, a particular advantage when high speeds are used on shades that tend to dye unlevel.

The Series "52", a wholly new designed standard machine, is said to provide a number of new operating and construction advantages in addition to the new cloth handling system. They include 1) compact design incorporating overhead drive; 2) new door construction allowing door to slide up overhead or in flush with front partition exposing only from compartment for chemical additions; 3) location of pin-rail high above liquor level so that there is added chance for tangles to shake out before hitting rail; 4) "Film-Flow" water outlet for introducing even film of water across tub front; 5) built-in overflow for directing overflow liquors to drain; 6) scientific tub shape for accommodating greater fabric capacity with less water volume; and 7) "Controlled Resistance" welding of box type rib construction for reducing corrosion.

Details of the new dye beck are obtainable by requesting bulletin TM 52 from the Rodney Hunt Machine Company, Orange, Mass.

* Pats and pats pending

• Test Methods Forum to Highlight CATCC Annual Meeting

A two-day textile test methods forum and exhibit, the first of its kind in Canada, will be a feature of the annual meeting of the Canadian Association of Textile Colourists and Chemists, Quebec Section at the Mount Royal Hotel, Montreal, on April 25-26, 1952.

The committee appointed to handle this exhibit, working under E V Burnthall of the Ciba Co Ltd, have announced that preliminary plans have been completed. A general seminar and forum on test methods will be held on Friday night prior to the annual meeting and discussions will be led by technicians and others representative of dyeing, finishing, testing, laundering, sales, purchasing and consumer groups. This attempt to facilitate the interchange of ideas among technicians and management representatives of the textile industry will be supplemented by an extensive display and demonstration of textile testing equipment and laboratory supplies by manufacturers.

The three primary textile schools in Canada will be asked to undertake projects for this exhibit and space will also be provided for the National Research Council, Ontario Research Foundation, the Society of Dyers and Colourists in England and the American Association of Textile Chemists and Colorists, all of whom have been invited to participate.

Textile executives and managers will be among those invited to attend the forum and view exhibits which will be open from 12 noon on April 25 until 4 pm on April 26.

The committee on test methods appointed by the CATCC has completed a survey of actual test methods used in laboratories throughout Canada and will evaluate and announce shortly the results obtained from a second project. Samples of specially prepared dyed material were sent to 60 textile mill laboratories to be tested for washing, light and perspiration fastness. The results obtained to date reportedly offer conclusive evidence of the wide range of test methods in use throughout the industry.

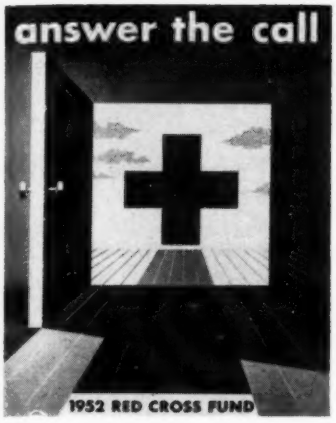
Members of this committee include: E V Burnthall, chairman; Dr C H Bayley, National Research Council, Ottawa; Dr C E Coke, Courtaulds (Canada) Ltd; F J Knight, Hubbard Felt Co Ltd; F D Wallace, Dominion Burlington Mills Ltd; and Dr L H Sheps, Trilon Chemicals Ltd. Exhibit Chairman is Leon E Moody of Duplan Dyeing Co Ltd, Valleyfield, Que.

• Six Textile Associations Now on ASA Roster

Six manufacturing companies and six trade associations now represent the textile industry on the roster of national organizations holding membership in the American Standards Association. This was revealed in ASA's annual 1951 membership report released on Jan 28.

ASA announced that it approved 113 American Standards in 1951, bringing the total number of new and revised American Standards in effect to 1,181. Newly approved standards of particular interest to the textile industry included 35 textile test methods developed by the American Society for Testing Materials and the American Association of Textile Chemists and Colorists.

ASA stated that its membership increased by 12 trade associations and technical societies and 84 company members in 1951.



• Mellin Chemicals to Continue

It has been announced that the business of Mellin Chemicals, Inc, 45 North Broad Street, Ridgewood, New Jersey will be continued as in the past. Nelson F Mellin, President and Treasurer, died on January 17th (see obituary on page 128).

• Dexter Holds Winter Conference in Charlotte

Executives and divisional managers of the Dexter Chemical Corporation met in Charlotte, N C, last month in a move which brought their 1952 Winter conference "right into the backyard of the nation's primary textile region", according to Joseph B Evans, director of sales.

Although Dexter's plant facilities and executive offices are located in New York, Mr Evans points out that the bulk of the company's operations are "keyed to textile mills of the South".

As an answer to the challenge of the new fibers, Dexter reported the results of research and the future aims in chemical antistatic treatment of nylon, dynel, Dacron and Orlon. Sidney M Edelstein, who headed technical activties at the meeting, explained that most of the conventional antistatic agents being offered today seem to fall into three main groups; the amines, which are substantive in nature and which tend to equalize the difference in potential characterizing the electrostatic condition; another chemical group, which virtually acts as a ground conductor and carries the charge into the surrounding atmosphere; and a third group that relies upon moisture retention to leak the charge. After pointing out the inadequacies of each, Mr Edelstein stated that the chief drawback to research of this kind is in the limited availability of prior research in this field. "Therefore", he stated, "the Dexter program not only involves the development of suitable antistatic agents but also the necessary phase of evolving new instruments and test methods which accurately describe the phenomenon of static electricity on textile fibers". He then went on to discuss the initial successes of Dextrol Lektrostat, introduced by the company some months ago, and to discuss generally the blessings of antistatic chemical.

Commenting on Dexter's expansion program, Mr Evans stated that his company's recent installation of unique high-speed, high-sulfonation equipment has jumped their capacity by 100% and that greater fluidity of the pipelines of supply has been effected by the addition of warehousing facilities in Charlotte.

The meeting which brought together divisional sales representatives and technical personnel to discuss the various aspects of Dexter's expanding program, was arranged by M L Slesinger, Southern sales manager, who acted as host along with Eugene Hanley, Dexter Southern Division representative.

• Phthalic Anhydride Expansion Goal

A goal for expanding facilities for the production of phthalic anhydride to total annual capacity of 367,000,000 pounds by the beginning of 1953 was set last month by Ralph S Trigg, deputy administrator of the DPA for Program and Requirements.

This is an increase of 140,000,000 pounds of capacity a year over the capacity available January 1, 1951, and is the amount determined as necessary to meet defense and essential civilian requirements. One of the important military uses is in rocket fuel.

Establishment of the expansion goal permits the DPA Office of Resources Expansion to consider applications for certificates permitting rapid tax amortization. These certificates permit a rapid write-off for tax purposes over a five-year period of all or a part of the cost of the new facilities. The normal period of depreciation for tax purposes is considerably longer.

Available supplies of phthalic anhydride are not sufficient to meet demand, and an informal industry allocation is now in effect, DPA stated. Thirteen applications for certificates of necessity involving proposed phthalic production of 208,000,000 pounds a year have been received, it is learned.

Production of phthalic anhydride reportedly has already started at one of the installations included in the program.

• Celanese Chemical Division Opens New Chicago Offices

The Chemical Division of Celanese Corporation of America has announced the opening of new offices in Chicago at 101 East Ontario Street. The Midwest District Office was formerly located at the Merchandise Mart in Chicago.

Thomas G Davis, district manager, Chemical Division, and G J Boyer, Midwest district representative, will be located in this office.

• J P Stevens Centralizes Southern Dyestuff Purchases

J P Stevens & Co, Inc began to centralize purchases of dyestuffs and chemicals for several of the company plants at the Central Purchasing Offices in Greensboro, North Carolina on February 1. Purchases for the three Delta Finishing Co plants at Attleboro, Mass, Philadelphia, Pa, and Wallace, S C, as well as the Appleton Company, Republic Cotton Mills and Industrial Cotton Mills, will be handled at Greensboro. The new purchasing operation is under the direction of B M Keever. Mr Keever has been assistant to S B Carson, manager of Delta Plant #3 at Wallace, S C, since 1949 and prior to that time was connected with Burlington Mills.

The new Central Purchasing Office, in addition to controlling purchases of dyestuffs and chemicals, will also contain a research section under Dr Oliver Grosz, it is learned, which will carry forward finishing and dyeing research, quality control, analysis of new materials and better processing methods. Collaboration with the technicians from dyestuff, chemical and finishing product suppliers and standard test checking will also be conducted under his supervision. Dr Grosz has had research responsibilities for the company at Delta #1, Philadelphia, Pa, since 1949 and prior to that time was connected with Collins & Aikman.

• Hooker Presents Watches To 25-Year Employees

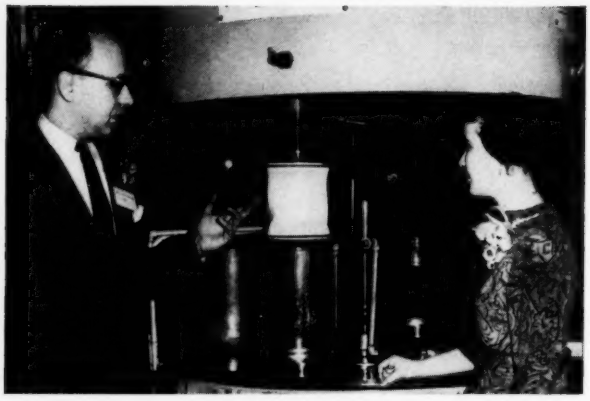
Hooker Electrochemical Company, Niagara Falls, has presented engraved gold watches to 136 employees, both active and retired, who were in the service of the company for 25 years or over.

Presentation on behalf of the company was made by Bjarne Klaussen, executive vice president who has been with Hooker for 35 years. The group represented 5,134 years of service, an average of 32 years.

• Lt Cmdr Farnsworth Featured at 16th P-W Color Group Meeting

Lieutenant Commander Dean Farnsworth, head of the Visual Engineering Section, U S Naval Medical Research Laboratory, U S Naval Submarine Base, New London, Conn, was the chief speaker at the Sixteenth Meeting of the Philadelphia-Wilmington Color Group held on January 10th at the Philadelphia Textile Institute. Commander Farnsworth's topic was, "Color Vision Problems in the U S Submarine Navy".

Known chiefly as the creator of the Farnsworth-Munsell-100 Hue color vision test, Commander Farnsworth is prominent in the fields of color lighting, vision and design.



(Above) Norton C Foster, Dow Corning Corporation technical representative, demonstrates to Rosemarie Votts a machine designed to show the durability and water repellency of Decetex 104, one of the features at the Corporation's exhibit of silicones.

(Below) William May, Product Development Lab, Dow Corning Corporation demonstrates that a column of foam is reduced to a few drop of liquid by a thin film of Antifoam A applied to the end of the glass tube.

• Dow Corning Exhibits Prove Silicones Versatility

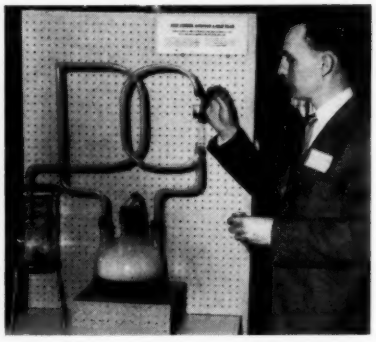
Philadelphia, New York and Boston were treated during the latter part of January to an extensive exhibit demonstrating established military and industrial applications of silicones. The exhibit, sponsored by the Dow Corning Corporation, Midland, Michigan, aptly shows the significant inventions derived from these semiinorganic materials, and serves to answer the question, "What's a silicone".

The first section of the exhibit demonstrates the heat stability characteristics of the silicones for use in such applications as protective coatings, seals, electrical insulating materials, etc. For example, heat stability and resistance to hot oil is demonstrated by a device that constantly flexes a Silastic bellows into an oil bath at 350°F.

The next part of the exhibit demonstrates the usefulness of the silicones at low temperatures, while further along, their serviceability and stability is borne out at both high and low temperatures.

Many test samples and applications demonstrate their exceptional resistance to oxidation, outdoor weathering and passage of time. Their durability as water repellents is probably best demonstrated in a machine which alternately washes, rinses, dries and spray-rates samples of treated fabric. Water repellency is further demonstrated in the buoyancy given to glass fibers used in Navy life jackets.

Following additional sections devoted to the use of silicones as dielectric materials, a final section serves to illustrate the effectiveness of a silicone defoamer, Antifoam A, and to demonstrate the use of silicones as polishing agents, as mold release agents, in the phenolic sand shell foundry technique



for casting metals and in food processing.

Additional showings of the exhibit are scheduled during the next two months in Western cities. A 32-page booklet, "What's a Silicone" may be obtained from Dow Corning Corporation by addressing Department AW-12.

• TRI Dyeing Research Advisory Committee Reports

At the January meeting of the Textile Research Institute Dyeing Research Advisory Committee, Dr Howard J White, Jr, staff scientist, reported that no evidence has been found to support the "internal solution" theory of dyeing. The simplest absorption model which qualitatively fits Dr White's experimental data is said to be one of absorption onto strong bonding sites throughout the fiber with competition between various components of the dye bath for these sites.

From a theoretical standpoint, the model proposed by Gilbert and Rideal is said to come closest to fitting the experimental facts although it reportedly fails to predict all data quantitatively. It was pointed out that the experimental data suggest that a variety of absorption sites should be considered rather than one type only and that some consideration should be given to the fact that the fiber is swollen during the dyeing process. Dr White stated, however, that much more experimental and theoretical work must be done before the electrostatic interactions which occur within a fiber are completely understood.

D L Underwood, research fellow, reported the development of a device for the remote handling of weighing bottles at constant temperature and relative humidity. In previous experiments utilizing radioactive isotopes the rate and amount of absorption of all components of a dye bath with the exception of water have been measured simultaneously. The remote handling device used in connection with other newly developed experimental techniques now is said to enable Dr White's group to measure the uptake by a fiber of all components of the dye bath including the water and to observe the competition of the various dye bath components for sites within the fiber.

Report was also made of experimental dyeing of acetate from benzene solutions. Equilibrium absorption data have been obtained at two temperatures of dyeing, it was stated, and further work will be carried out on the application of Langmuir's isotherm and on the determination of the heat of absorption.

In addition to members of the TRI staff the following attended the meeting: Jackson Woodruff, American Viscose Corporation; John Neely, Burlington Mills Corporation; M Carroll, Celanese Corporation of America; V S Salvin, Celanese Corporation of America; R W Work, Celanese Corporation of America; William J Jutras, Cranston Print Works Company; E A Murray, Deering Milliken Research Trust; H E Schroeder, E I du Pont de Nemours, Organic Chemicals; Linton G Ray, E I du Pont de Nemours, Textile Fibers Dept; Fred V Traut, Globe Dye Works Company; E W Rhael, Sandoz Chemical Works; James M Straley, Tennessee Eastman Company; Werner von Bergen, Fortsmann Woolen Company.

• Augusta Plans Expansion Into Field of Insoluble Azos

Expansion plans by the Augusta Chemical Company, Augusta, Ga, call for movement into the field of insoluble azos, it is learned.

Augusta now produces naphthols of the "AS" series, one of the two requisite materials for the production of insoluble azos, which are used for economical and rapid printing of bright and fast colors. The naphthols are also used in the production of paint pigments, printing ink colors and lacquer colors.

NAMES IN THE NEWS

KENNETH C TOWE was elected president of the American Cyanamid Company at the meeting of the Board of Directors on Tuesday, January 22. He succeeds the late RAYMOND C GAUGLER, who died suddenly on Jan 11 (see obituary). Mr Towe has been a director of the Company since 1939, joining the Cyanamid organization as a member of the Accounting Department in 1926. HOWARD HUSTON, Cyanamid vice president, was elected a director to fill another vacancy created by Mr Gaugler's death.

Kenneth C Towe

DR GEORGE O CURME, JR has been elected a director of Union Carbide and Carbon Corporation to succeed the late James A Rafferty, according to an announcement by Fred H Haggerson, chairman of the Board and Corporation president. Dr Curme, as vice-president, is now in charge of all research activities. He has been a leader in the field of chemistry for many years, and is a pioneer in petrochemicals.

George O Curme, Jr

HERCULES POWDER COMPANY announced the following executive appointments during January:

In the Synthetics Department, HENRY A THOURON has been named to the newly-created position of assistant general manager; JAMES W L MONKMAN succeeds Mr Thouron as director of sales; and PAUL L JOHNSTONE becomes director of development (also a newly-created position).

In the Cellulose Products Department, DAVID S BRUCE has been named manager of new product production. He comes from the Company's Parlin, N J, Cellulose Products Plant where he served for the past four years as assistant plant manager.

THE appointment of DR E W VOLKMANN as associate director, Research Department, of Koppers Company, Inc, was announced in Pittsburgh last month by Dr G F D'Alelio, vice president and manager of the Department. In this position, Dr Volkmann will give general assistance to the research manager in supervision of all Company technical research, the formulation of technical research plans and policies on a Company-wide basis and direct supervision of activities of the Research Department.

MONSANTO CHEMICAL COMPANY last month announced that WALTER L CAMPBELL had been named advertising manager of the Company's Merrimac Division, succeeding EDMUND GREENE, who has been transferred to the Organic Chemicals Division in St Louis. Mr Greene assumes the newly-created position of sales promotion manager.

Mr Campbell moves up from assistant advertising manager, a post he has held since 1949. Mr Greene held the Merrimac post since 1947.

CARL PACIFICO has been named director of the development department, Wyandotte Chemicals Corporation. His responsibilities reportedly include direction of all the phases of market development, and technical service of new organic chemical products.

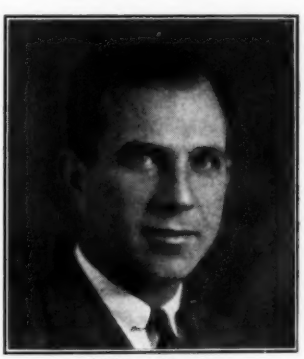
Prior to assuming this new position, Mr Pacifico was a member of the Wyandotte field service staff, engaged primarily in the commercial development of applications for Pluronics, Wyandotte's new nonionic detergents, and specialized grades of Carbose, Wyandotte's sodium carboxymethylcellulose.

Carl Pacifico

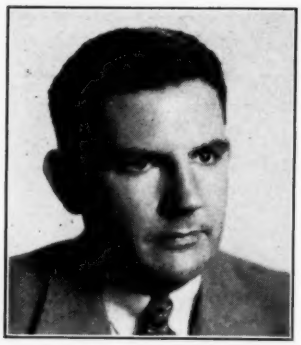
IN recognition of their outstanding scientific achievements, DR MILTON HARRIS and DR DONALD B KEYES have been elected Fellows of the New York Academy of Sciences. Dr Harris is president of the Harris Research Laboratories, Washington, D C; Dr Keyes is an adviser of the National Association of Manufacturers Research Committee, a special consultant to Heyden Chemical Corporation and a director of Heyden.

AFTER 28 years with the Cranston Print Works Company, Cranston, R I, JOSEPH P CUFF resigned on January 15th as director of sales and merchandising and head of the New York office. Mr Cuff joined the company at the age of 19 as secretary to Fred J Bigbee, who then headed the New York office, and assumed that post when Mr Bigbee died in 1928.

Mr Cuff's future plans have not been announced.



Milton Harris



Donald J Eccleston

Ira S Hurd

John L Severance

Murray H Morse

ERNEST NATHAN, vice president of the Sun Chemical Corporation, has announced the appointments of DONALD J ECCLESTON and IRA S HURD as general manager and sales manager, respectively, of the Warwick Chemical Company Division.

Mr Eccleston formerly held the position of manager of the Textile Chemical Division and prior to that was sales manager of Suntone pigment colors for the company. Prior to joining Warwick, he was assistant general manager of Glasgo (Conn) Finishing Co.

Mr Hurd was formerly sales manager of the Textile Chemical Department. In the past, Mr Hurd has been associated with Glenlyon Print Works, Rohm & Haas Co and Dan River Mills, Inc, in various capacities.

JOHN A C POPE has resigned as secretary-treasurer of the Wilson Export & Import Corporation and as secretary-treasurer of the Raritan Dyestuff Corporation and has sold his interests in both organizations.

DR E H MERCER, noted Australian wool scientist, has joined the staff of the Textile Research Institute for a year of co-operative study and research in connection with the International Wool Research Project. His initial work reportedly will be to study the surface of wool to improve the processing and dyeing of woolen garments.

At the end of his year in this country, Dr Mercer plans to return to the Division of Industrial Chemistry of the Commonwealth Scientific and Industrial Research Organization of Melbourne, Australia.

R WOLCOTT HOOKER, vice president in charge of sales of the Hooker Electrochemical Company, was elected president of the Compressed Gas Association, Inc, on January 22, succeeding DANIEL MAPES, vice president of Walter Kidde & Co. Mr Hooker also was re-elected president of The Chlorine Institute, Inc on January 23 for the fourth successive year.

JOSEPH P CHRIST has been named manager of the newly-opened Spartanburg, S C sales and service branch of Proctor and Schwartz, Inc. He assumes the post following the resignation of WALTER EGBERT, who had represented the textile machinery division of the Company in Greenville, and who was originally slated to manage the new Spartanburg Branch.

Mr Christ has been a member of the Textile Machinery Sales Division of Proctor and Schwartz, Inc since the Spring of 1950, before which time he served the company in the Textile Machinery engineering department. Immediately prior to his appointment to the Spartanburg post, Mr Christ served as ass't manager of the Proctor sales and service branch in Cohoes, N Y.

JOHN L SEVERANCE, secretary of the Association of Cotton Textile Merchants of New York since 1944, has been appointed lecturer for courses in merchandising of textiles to be conducted each Saturday during the Spring, 1952, semester at the Philadelphia Textile Institute.

BJORN ANDERSON, vice president of Celanese Corporation of America, has been named technical director of the company. He will move to the New York offices from Summit, New Jersey, where he has been director of the central research laboratories for the last four years.

B B ALLEN and R T ARMSTRONG have been named associate research directors in charge at the Summit facility.

H J PHILIPP (CQ) has been transferred from the Narrows, Virginia, plant to New York where he will be co-ordinator of technical control and responsible to G W SEYMOUR, vice president in charge of technical control.

MURRAY H MORSE, beginning his 27th year in the textile industry (22 of them with American Viscose Corporation), has been named assistant to WILLIAM G LUTTGE, general sales manager of the Chemstrand Corporation. The Chemstrand sales staff, as previously noted, is being organized with headquarters at 350 Fifth Ave, New York.

Mr Morse, who has been with AVC since 1929, was placed on special assignment in the field of converter relations in 1950.

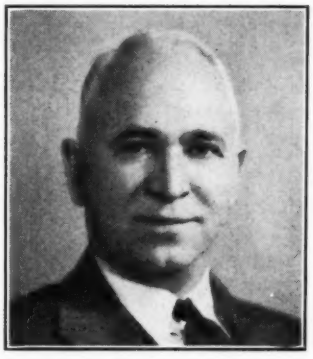
THE appointment of JAMES R REDMOND as divisional vice-president of Interchemical Corporation's Textile Colors Division (Hawthorne, N J) has been announced by Norman S Cassel, divisional president. Mr Redmond joined the Textile Colors Division in 1945. He was appointed New England District manager in 1948, and will continue in that capacity with headquarters in Pawtucket, R I. Among his varied activities, he is a member and ex-chairman of the AATCC Committee on Fire Resistant Textiles.

James R Redmond

FREDERIC A SODERBERG, manager of the Industrial Division of the General Dyestuff Corporation, has been elected chairman of the Chemical Marketing Subdivision of the American Chemical Society for 1952, succeeding DR W W DUECKER, research director of the Texas Gulf Sulphur Company.

CARL A SETTERSTROM, sales manager for textile fibers of the Carbide and Carbon Chemicals Company, was chosen chairman-elect and L F LOUTREL, JR, Monsanto Chemical Company, was renamed secretary. LAWRENCE H FLETT, director of the New Products Division, National Aniline Division, Allied Chemical and Dye Corporation, WILLIAM H HARDING, director of the Technical Service and Development Division, American Cyanamid Company, and Dr Duecker were elected to a steering committee, which will aid in the development of programs for the semiannual meeting of the Chemical Marketing group.

The Chemical Marketing Subdivision was formed three years ago to study the manifold problems associated with marketing chemical products. The group, now a unit of the Society's Division of Industrial and Engineering Chemistry, may eventually become an independent division of the Society.



Lawrence H Flett

DR FOSTER D SNELL, president of the New York research firm bearing his name, recently spoke on the subject of surface active agents and synthetic detergents before sections of the American Chemical Society in Indiana and Kentucky. After summarizing properties of the synthetic detergents and methods for their large-scale manufacture, he outlined the results of their development as applied to European and South American markets.

DR DANIEL FRISHMAN has returned to the Harris Research Laboratories, Washington, D C, after having served for two years as director of research at Hollander & Sons. Other additions to the staff include TYRONE Z DENESSY, who recently arrived from Germany (where he was employed at the Research Institute for Textile Chemistry at Badenweiler), MARILYN ELLISON, formerly of Gillette Laboratories in Boston, SHIRLEY P McGINN, NANCY G LIPPS, GENEVIEVE A POORE and ANNE M VANN.

Azel W Mack

THE Piedmont Section, AATCC received a surprise guest at their Winston-Salem meeting recently in AZEL W MACK, secretary of the Northern New England Section, hosts of the 1952 convention.

Mr Mack, who is New England sales manager of the Dexter Chemical Corporation, has been completing a tour of southern mills. He attended the meeting with M L SLESINGER, Southern sales manager for Dexter, and EUGENE HENLEY, division representative.

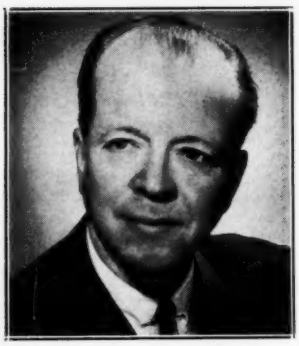
DR DOROTHY THOMPSON, associate professor of chemistry and chairman of that department at Sweet Briar College, is spending the second semester of this year in research at the Institute of Textile Technology. She is on sabbatical leave from her duties at Sweet Briar.

GLASS FIBERS INC, Toledo, Ohio, welcomed two new vice presidents following a recent meeting of the Board of Directors. F J SOLON, JR, who joined the organization in 1947, was named v p—advertising and public relations while RAYMOND W CAPAUL was re-elected general sales manager in addition to his new vice presidency post.

GEN E R QUESADA, Retired, has been elected vice-president and director of Olin Industries, Inc, E Alton, Ill. Gen Quesada, who recently retired from the Air Force as Lieutenant General after 27 years of service, will be directly concerned with Olin Industries' contemplated expansion program in the field of cellulose and minerals.

(Right): A recent picture of CARL PULLER, who recently celebrated his 75th birthday (see page 60, issue of Jan 21). Mr Puller for the past 12 years has been with the Pfister Chemical Works, Ridgefield, N J.

Carl Puller



J H Bruun

Constantin J Monego

Sidney J Gluck

Michael Stumm

DR J H BRUUN has been named to head the newly-created Commercial Development Department within the General Aniline Works Division, General Aniline & Film Corp, in furtherance of the organizational program announced last September by John C Franklin, GAW vice president of operations.

Dr Bruun, as director of commercial development, will make his headquarters at the Division's offices, 435 Hudson St, New York, where he and his associates will have the responsibility to study, evaluate and develop markets for new chemicals, other than dyestuffs, and new fields for marketing the present line of chemicals manufactured by General Aniline. He was formerly director of research at GAF's Central Research Laboratories at Easton, Pa.

LLOYD L SHAULIS, who has been named commercial research manager under Dr Bruun, will direct commercial research at the Divisional offices. His activities will include study and evaluation of markets for new chemicals and new fields for marketing the present line of GAF chemicals sold through the Antara Chemicals Division. He will also continue to head the Division's sales forecasting and economic advice section.

The General Aniline Works Division product development work will continue to be performed by the product development group at Easton, Pa, under the supervision of DR P M KIRK. Dr Kirk, as product development manager, will report to the director of commercial development and will be responsible for the development of markets for new chemicals and new fields for marketing the present chemical line.

DR HENRY B HASS has been named director of research, reporting to Mr Franklin. He will be located at Easton, and will be responsible for formulating the division's research programs, policies and procedures, and for the direction of all technical and administrative functions of the Central Research Laboratory.

The functional control of the plant laboratories and pilot plants will be added to the over-all responsibilities of C T WHITE, vice president of production, General Aniline Works. Aiding him in his duties will be DR J C MOESSINGER, who has been appointed director of process development. Dr Moessinger will be responsible for technical guidance and functional supervision of process development and chemical engineering at the Grasselli, N J, and Rensselaer, N Y, plants.

DR JESSE WERNER, newly-appointed technical assistant to Mr Franklin, will assist on the programming of various technical aspects of GAW's operations, in addition to maintaining close contact with all phases of the Division's acetylene program. Dr Werner was formerly assistant manager of the Process Development Dep't at GAF's Grasselli plant. Dr Werner is succeeded at Grasselli by DR CHRIS C SCHULZE, former Vat Color Area supervisor, Process Development. Dr Schulze, in turn, is succeeded by DR ROBERT E BROUILLARD.

MILTON WALTCHER has been appointed manager of the Industrial Engineering Dep't at Grasselli, where he had been acting department manager since last April.

CONSTANTIN J MONEGO, former assistant professor of Dyeing and Printing at the Philadelphia Textile Institute, is now a technologist with the Philadelphia Quartermaster Depot, Research and Development Branch, where he has been employed for the past seven months.

SIDNEY J GLUCK, designer and technician in the field of elastic fabrics since 1933, has consummated an agreement between his firm, Malibu Fabrics, Inc, New York, and Textiles Morelos de Cuernavaca of Mexico. The latter firm is a mill subsidiary of Burlington Sales of Mexico, an affiliate of Burlington Mills International. Textiles Morelos de Cuernavaca reportedly will manufacture broad woven elastic goods of Malibu Fabric constructions, designed by Mr Gluck, that will be sold under Malibu and Burlington trade marks to the Latin American swimwear and foundation garment trades.

THE appointment of CARLTON H GILBERT to the newly-created position of advertising manager for the United States Rubber Company became effective on February 15th. Mr Gilbert has had 24 years experience in advertising, starting with J C Bull Inc in 1927. He continued there until 1934 when he joined the sales promotion department of U S Rubber's footwear division.

M J PHILLIPS, president of the Industrial Advertising Association of New York, Inc, has announced the appointment of MICHAEL STUMM, advertising manager of the Crucible Steel Company of America, as second vice president of the Association. Mr Stumm's duties will include Chairmanship of the Membership Committee.

AMERICAN Cyanamid Company within recent weeks has announced the following appointments:

FRED J STICKLE, former technical sales representative, will supervise sales and sales promotion of coating resins in the Boston, New York and Philadelphia areas as Eastern regional sales Manager of the Coating Resins Department.

P E HOLDER, former Chicago district sales representative, has been named assistant district manager of the St Louis district for the Industrial Chemicals Division.

BENGT O L DOMANDER as a new sales representative will cover industries served in Ontario by the Calco Chemical Division, North American Cyanamid Limited of Montreal and Toronto. Mr Domander, a native of Finland, came to Canada in 1927.

THE appointment of NORMAN C WEIL as director of technical service for the Alkali Section, Solvay Process Division, Allied Chemical & Dye Corporation, recently became effective. Mr Weil replaces CARL SUNDSTROM, who retired at the end of 1951 after 52 years with the Company. Since 1938 Mr Sundstrom had served as manager of technical service.

Mr Weil formerly was manager of the chlorine and water supply group in the Technical Service Department. It is learned that he will remain at the Department's headquarters in Syracuse, N Y.

DR FREDERIC BONNET, pioneer in the development and utilization of rayon, will receive the Harold DeWitt Smith Memorial Medal at the March 1952 meeting of ASTM Committee D-13. The medal, a testimonial to the late Mr Smith, is awarded for outstanding accomplishment in the field of textile fiber science and utilization.

Dr Bonnet was for many years director of the Standards Dep't, American Viscose Corp, and, since 1946 (when he retired), has been consultant and technical advisor to the president.

As a member of the Flammability Committee of the American Association of Textile Chemists and Colorists, he has been especially active in matters concerning legislation in regard to flammable textiles.

GEORGE J MULLER has been elected president of Morningstar, Nicol, Inc, according to a recent announcement by Joseph Morningstar, retiring president of the company. Mr Morningstar now becomes Chairman of the Board of Directors.

Mr Muller, formerly the executive vice president, has been a member of the Board of Directors since 1930. He began his career with the Morningstar Company in 1918, and has charge of the production and import business.

Mr Morningstar also announced that MURRAY STEMPEL, a member of the Board of Directors, has been elected executive vice president in Mr Muller's place. R MAYSON FOSTER has been made treasurer and a member of the Board of Directors.

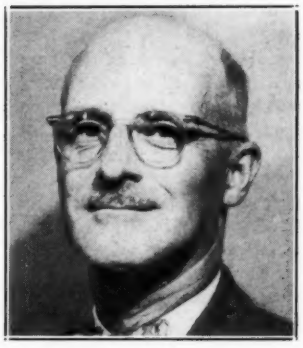
THE designation of a sales manager for its General Products Division and major rearrangement of assignments of two vice presidents have been announced by Harold Boeschenstein, president of Owens-Corning Fiberglas Corporation.

BEN S WRIGHT, vice president since 1949 and general sales manager since 1947, was reassigned as vice president in charge of purchasing and trade relations; E W SMITH, who was appointed vice president and director of merchandising last May, was reassigned as vice president in charge of sales branches and training programs; and EDWARD J DETGEN was named sales manager of the General Products Division. All will make their headquarters in the Owens-Corning general offices in the Nicholas Building, Toledo, Ohio.

ROBERT T HASLAM has been elected a member of the board of directors of the Dewey and Almy Chemical Company, according to an announcement by BRADLEY DEWEY, president. Mr Haslam, a chemical and marketing executive is a former vice-president and director of Standard Oil Company of New Jersey, where his responsibilities included direction of research and sales.

DR FRED R CONKLIN has become the new works manager of the Tennessee Eastman Company, it is learned. HERBERT G STONE, formerly vice president and works manager, will continue as vice president of the Company.

Dr Conklin has been with the Tennessee Eastman organization since 1931. Since 1947, he has been assistant works manager at the Kingsport plant. Prior to that he served as works manager of the Eastman-operated electromagnetic plant at Oak Ridge, Tenn.



P E Holder

Bengt O L Domander

Edward J Detgen

Fred R Conklin

IT is reported from Washington that WILLIAM P DRAKE, vice president, Pennsylvania Salt Manufacturing Company, has been named director of the Rubber, Chemicals and Drugs Division of the Office of Price Administration to succeed THOMAS H McCORMACK, who is returning to his duties as director of sales of the Grasselli Chemicals Division, E I du Pont de Nemours & Co, Inc. OPS Director Michael V DiSalle has announced that Mr Drake will serve as director until next July 1.

As "Pennsalt" vice president in charge of sales, Mr Drake has headed the chemical company's nine sales departments, which serve many of the nation's industries. He joined the company in 1934 in its student training course. Then, successively, he was a salesman, a manager of sales, and assistant vice president in charge of sales, before his appointment as vice president in 1949.

The announcement follows a previous one by Mr Drake to the effect that the Pennsylvania Salt Manufacturing Company had recently completed steps in a new organization of its Sales Division in order "to consolidate sales administration while retaining specialization essential to the company's diversified interests, and at the same time provide more emphasis on planning for current and future sales activities."

The line organization of the Sales Division is headed by RUSSELL S ROELLER as general sales manager. Mr Roeller previously was an assistant general sales manager, a position now eliminated. Reporting to him are ALBERT H CLEM as field sales manager, EDWIN S GARVERICH as manager of technical service, and the eight department sales managers. Mr Clem formerly was sales manager of the Industrial Chemicals Department. He will be responsible for all district sales offices and their managers will report to him. Mr Garverich formerly was manager of technical service on specialties.

The planning organization for the Sales Division is headed by ARTHUR G TUNSTALL, JR, as manager of marketing. Mr Tunstall also was previously an assistant general sales manager. Reporting to him are PAUL C HURLEY, manager of sales promotion; FRANKLIN A LUCARD, heading the new department of sales development, and MALCOLM J HARKINS in the new position of manager of sales control.

In line with the new organization, several changes in the managements of sales departments have been announced. GEORGE D GROGAN, formerly an assistant to the vice president in charge of sales, was named sales manager for Industrial Chemicals, replacing Mr Clem.

JOSEPH J DUFFY, JR, was named sales manager of the Fos Products and Industrial Cleaners Department, a new department formed from consolidation of the former Fos Products Department and Special Chemicals Department.

ROBERT R PIERCE was appointed sales manager of the newly-formed Corrosion Engineering Products Department. He was formerly a products supervisor on Pennsalt's corrosion-resistant cements and paints, which were marketed by the Industrial Chemicals Department.

EDWARD M WILSON, formerly an assistant to the vice president in charge of sales, was appointed manager of the Government Sales Department. This department was previously in existence but was administered by Mr Drake and Mr Wilson jointly.

As a preceding step leading up to the new organization, Pennsalt earlier this year consolidated all its district sales offices and set up several new ones. In these offices all salesmen, while remaining as specialists in their various fields, will report to the district sales manager.

OBITUARY

LESLIE N HOOD

LESLIE N HOOD, a charter member of the American Association of Textile Chemists and Colorists, died suddenly at his home in Beech Grove, Indiana, on December 14th at the age of 63.

He was a graduate of Lowell Textile Institute in Textile Chemistry, class of 1912. After leaving school, he started with Sayles Finishing Plant in Saylesville, Rhode Island; later was connected with the Selma Manufacturing Company, Selma, Alabama; and at the time of his death was employed as superintendent at Indianapolis Bleaching Company, Indianapolis, Indiana.

CHARLES J SALA

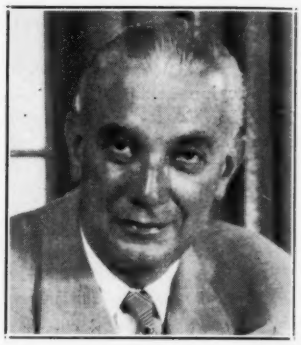
DR CHARLES J SALA, 61, a dye expert in the Organic Chemicals Department, E I du Pont de Nemours & Co, Inc, succumbed recently while visiting his mother at Vische Canavese, Italy.

As a specialist in textile printing and the application of vat dyes, Dr Sala held many patents. Among his notable accomplishments while with Du Pont is the development of Leucosol Color S.

Dr Sala studied at the Universities of Nancy (France) and Pavia (Italy), and came to the U S in 1922. He had been with Du Pont continuously since 1923.

RAYMOND C GAUGLER

RAYMOND C GAUGLER, 59-year-old president of American Cyanamid Company, suffered a cerebral hemorrhage on January 10th, and died at 12:30 A M (Jan 11th) at the New Rochelle, N Y, hospital.



Raymond C Gaugler

Mr Gaugler, who has been with Cyanamid since 1917, served as assistant treasurer and comptroller, and was named treasurer in 1929. In 1939 he became vice president in charge of finance; in 1947, executive vice president. He was elected president Jan 5, 1951, succeeding the late W B Bell.

During his years with Cyanamid, Mr Gaugler played a most important part in the broad diversification program. A Cyanamid director since 1929, he served in the same capacity for several companies associated with ACC, as well as several subsidiaries.

NELSON F MELLIN

NELSON F MELLIN, President and Treasurer of Mellin Chemicals, Inc, Ridgewood, New Jersey, died at his home in Glen Rock on January 17th after a long illness. He was 42 years old.

He received his degree in chemical engineering from Pratt Institute in 1928 and joined the DuPont Company upon graduation. He left his position as technical salesman in the Electrochemicals Department of DuPont in 1946 to form his own company.

Mr Mellin was a member of the American Association of Textile Chemists and Colorists and the Salesmen's Association of the American Chemical Industry. He is survived by his wife and two sons.

Nelson F Mellin

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